

Question 3 of 220

A 41-year-old man who was diagnosed with epilepsy around 30 years ago comes to see you. He has heard there has been a change in driving regulations for epileptics. His epilepsy is currently controlled with sodium valproate monotherapy. What is the minimum length of time he must be seizure free before driving his car?

- ☐ A. 3 months
- ☐ B. 6 months
- ☒ C. 12 months
- ☐ D. 2 years
- ☐ E. 5 years

DVLA: neurological disorders

The guidelines below relate to car/motorcycle use unless specifically stated. For obvious reasons, the rules relating to drivers of heavy goods vehicles tend to be much stricter

Specific rules

- first seizure: 6 months off driving*. For patients with established epilepsy they must be fit free for 12 months before being able to drive
- stroke or TIA: 1 month off driving
- multiple TIAs over short period of times: 3 months off driving
- craniotomy e.g. For meningioma: 1 year off driving**
- pituitary tumour: craniotomy: 6 months; trans-sphenoidal surgery 'can drive when there is no debarring residual impairment likely to affect safe driving'
- narcolepsy/cataplexy: cease driving on diagnosis, can restart once 'satisfactory control of symptoms'
- chronic neurological disorders e.g. multiple sclerosis, motor neuron disease: DVLA should be informed, complete PK1 form (application for driving licence holders state of health)

Syncope

- simple faint: no restriction
- single episode, explained and treated: 4 weeks off
- single episode, unexplained: 6 months off
- two or more episodes: 12 months off

*previously rule was 12 months. It is now 6 months off driving if the licence holder has undergone assessment by an appropriate specialist and no relevant abnormality has been identified on investigation, for example EEG and brain scan where indicated

**if the tumour is a benign meningioma and there is no seizure history, licence can be reconsidered 6 months after surgery if remains seizure free

Question 8 of 220

A 54-year-old man is admitted following a myocardial infarction associated with ST elevation. He is treated with thrombolysis and does not undergo angioplasty. What advice should he be given regarding driving?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Can continue driving but must inform DVLA |
| <input type="radio"/> | B. Cannot drive until an angiogram has been performed and reviewed by a cardiologist |
| <input type="radio"/> | C. Cannot drive for 1 week |
| <input checked="" type="radio"/> | D. Cannot drive for 4 weeks |
| <input type="radio"/> | E. Cannot drive for 12 weeks |

DVLA advice post MI - cannot drive for 4 weeks

The April 2009 AKT feedback report made specific mention of fitness to drive rules.

DVLA: cardiovascular disorders

The guidelines below relate to car/motorcycle use unless specifically stated. For obvious reasons, the rules relating to drivers of heavy goods vehicles tend to be much stricter

Specific rules

- hypertension - can drive unless treatment causes unacceptable side effects, no need to notify DVLA. If Group 2 Entitlement the disqualifies from driving if resting BP consistently 180 mmHg systolic or more and/or 100 mm Hg diastolic or more
- angioplasty (elective) - 1 week off driving
- CABG - 4 weeks off driving
- acute coronary syndrome- 4 weeks off driving, 1 week if successfully treated by angioplasty
- angina - driving must cease if symptoms occur at rest/at the wheel
- pacemaker insertion - 1 week off driving
- implantable cardioverter-defibrillator: if implanted for sustained ventricular arrhythmia: cease driving for 6 months. If implanted prophylactically then cease driving for 1 month
- successful catheter ablation for an arrhythmia- 2 days off driving
- aortic aneurysm of 6cm or more - notify DVLA. Licensing will be permitted subject to annual review. An aortic diameter of 6.5 cm or more disqualifies patients from driving
- heart transplant: DVLA do not need to be notified

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You receive a phone call from one of your patients who is abroad. He is 60-years-old and has just been discharged following admission to a Spanish hospital after suffering a myocardial infarction. There were no reported complications and he did not undergo a percutaneous coronary intervention. How soon after the myocardial infarction can he fly home?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. After 3-5 days |
| <input type="radio"/> | B. After 14 days |
| <input type="radio"/> | C. After 4 weeks |
| <input type="radio"/> | D. After 48 hours if no further chest pain |
| <input checked="" type="radio"/> | E. After 7-10 days |

Fitness to fly - MI - after 7-10 days

Fitness to fly

The Civil Aviation Authority (CAA) has issued guidelines on air travel for people with medical conditions; please see the link provided.

Cardiovascular disease

- unstable angina, uncontrolled hypertension, uncontrolled cardiac arrhythmia, decompensated heart failure, severe symptomatic valvular disease: should not fly
- uncomplicated myocardial infarction: may fly after 7-10 days
- complicated myocardial infarction: after 4-6 weeks
- coronary artery bypass graft: after 10-14 days
- percutaneous coronary intervention: after 5 days

Respiratory disease

- pneumonia: should be 'clinically improved with no residual infection'
- pneumothorax: absolute contraindication, the CAA suggest patients may travel 2 weeks after successful drainage if there is no residual air. The British Thoracic Society used to recommend not travelling by air for a period of 6 weeks but this has now been changed to 1 week post check x-ray

Pregnancy

- most airlines do not allow travel after 36 weeks for a single pregnancy and after 32 weeks for a multiple pregnancy
- most airlines require a certificate after 28 weeks confirming that the pregnancy is progressing normally

Surgery

- travel should be avoided for 10 days following abdominal surgery
- laparoscopic surgery: after 24 hours
- colonoscopy: after 24 hours
- following the application of a plaster cast, the majority of airlines restrict flying for 24 hours on flights of less than 2 hours or 48 hours for longer flights

Haematological disorders

- patients with a haemoglobin of greater than 8 g/dl may travel without problems (assuming there is no coexisting condition such as cardiovascular or respiratory disease)

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A 21-year-old female is seen in the first seizure clinic in the outpatient department. Both the EEG and MRI brain are normal. A decision is made not to start her on anti-epileptic medication. What restrictions on driving should she be informed about?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. No restrictions but inform DVLA |
| <input type="radio"/> | B. No restrictions, no need to inform DVLA if not on medication |
| <input type="radio"/> | C. Cannot drive for 1 month from date of seizure |
| <input checked="" type="radio"/> | D. Cannot drive for 6 months from date of seizure |
| <input type="radio"/> | E. Cannot drive for 1 year from date of seizure |

Patients cannot drive for 6 months following a seizure

DVLA: neurological disorders

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Specific rules

- first seizure: 6 months off driving*. For patients with established epilepsy they must be fit free for 12 months before being able to drive
- stroke or TIA: 1 month off driving
- multiple TIAs over short period of times: 3 months off driving
- craniotomy e.g. For meningioma: 1 year off driving**
- pituitary tumour: craniotomy: 6 months; trans-sphenoidal surgery 'can drive when there is no debarring residual impairment likely to affect safe driving'
- narcolepsy/cataplexy: cease driving on diagnosis, can restart once 'satisfactory control of symptoms'
- chronic neurological disorders e.g. multiple sclerosis, motor neuron disease: DVLA should be informed, complete PK1 form (application for driving licence holders state of health)

Syncope

- simple faint: no restriction
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*previously rule was 12 months. It is now 6 months off driving if the licence holder has undergone assessment by an appropriate specialist and no relevant abnormality has been identified on investigation, for example EEG and brain scan where indicated

**if the tumour is a benign meningioma and there is no seizure history, licence can be reconsidered 6 months after surgery if remains seizure free

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Theme: DVLA: neurological disorders

- A. No restriction
- B. No restriction but inform DVLA
- C. 1 month off
- D. 3 months off
- E. 6 months off
- F. 12 months off
- G. Once satisfactory control of symptoms

For each of the following scenarios select the most appropriate advice regarding driving:

49. Stroke - satisfactory clinical recovery

You answered 3 months off

The correct answer is 1 month off

50. Transient ischaemic attack - single episode

 1 month off

51. Unexplained syncope. Second episode in past 2 months. Under investigation by cardiologist for abnormal echocardiogram

You answered Once satisfactory control of symptoms

The correct answer is 12 months off

If low risk of recurrence then only restricted for 4 weeks

DVLA: neurological disorders

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Theme: Scoring systems used in medicine

- A. Gleason score
- B. Bishop score
- C. Smith scale
- D. CHA₂DS₂-VASc
- E. ABCD2
- F. DAS28
- G. MMSE
- H. BRIC
- I. CURB-65
- J. Epworth scale

For each of the following please select the appropriate scoring system:

- 62.** Used in the assessment of suspected obstructive sleep apnoea

You answered Gleason score

The correct answer is Epworth scale

- 63.** Used to determine the need to anticoagulate a patient in atrial fibrillation

You answered Epworth scale

The correct answer is CHA₂DS₂-VASc

- 64.** Measure of disease activity in rheumatoid arthritis

 DAS28

Scoring systems

There are now numerous scoring systems used in medicine. The table below lists some of the more common ones:

Scoring system	Notes
CHA₂DS₂-VASc	Used to determine the need to anticoagulate a patient in atrial fibrillation
ABCD2	Prognostic score for risk stratifying patients who've had a suspected TIA
NYHA	Heart failure severity scale
DAS28	Measure of disease activity in rheumatoid arthritis
Child-Pugh classification	A scoring system used to assess the severity of liver cirrhosis
Wells score	Helps estimate the risk of a patient having a deep vein thrombosis
MMSE	Mini-mental state examination - used to assess cognitive impairment
HAD	Hospital Anxiety and Depression (HAD) scale - assesses severity of anxiety and depression symptoms
PHQ-9	Patient Health Questionnaire - assesses severity of depression symptoms
GAD-7	Used as a screening tool and severity measure for generalised anxiety disorder
Edinburgh Postnatal Depression Score	Used to screen for postnatal depression
SCOFF	Questionnaire used to detect eating disorders and aid treatment
AUDIT	Alcohol screening tool
CAGE	Alcohol screening tool
FAST*	Alcohol screening tool
CURB-65	Used to assess the prognosis of a patient with pneumonia

Scoring system	Notes
Epworth Sleepiness Scale	Used in the assessment of suspected obstructive sleep apnoea
IPSS	International prostate symptom score
Gleason score	Indicates prognosis in prostate cancer
APGAR	Assesses the health of a newborn immediately after birth
Bishop score	Used to help assess the whether induction of labour will be required
Waterlow score	Assesses the risk of a patient developing a pressure sore
FRAX	Risk assessment tool developed by WHO which calculates a patients 10-year risk of developing an osteoporosis related fracture
Ranson criteria	Acute pancreatitis

*FAST is also mnemonic to help patients/relatives identify the symptoms of a stroke

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A 24-year-old man who has been discharged following admission for a spontaneous pneumothorax ask for advice about flying. During his stay in hospital the pneumothorax was aspirated and a repeat x-ray revealed no residual air. What is the earliest time he should fly?

- ☐ A. Immediately after the repeat x-ray
- ☐ B. 24 hours after the repeat x-ray
- ☐ C. 3 days after the repeat x-ray
- ☒ D. 2 weeks after the repeat x-ray
- ☐ E. 4 weeks after the repeat x-ray

There is a discrepancy in the Civil Aviation Authority (CAA) and British Thoracic Society (BTS) guidelines relating to this issue. The CAA advise waiting 2 weeks whilst the BTS feel that 1 week is sufficient. Given that the option of 1 week is not given here 2 weeks is the most appropriate response.

Fitness to fly

The Civil Aviation Authority (CAA) has issued guidelines on air travel for people with medical conditions; please see the link provided.

Cardiovascular disease

- unstable angina, uncontrolled hypertension, uncontrolled cardiac arrhythmia, decompensated heart failure, severe symptomatic valvular disease: should not fly
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Respiratory disease

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Pregnancy

- most airlines do not allow travel after 36 weeks for a single pregnancy and after 32 weeks for a multiple pregnancy
- most airlines require a certificate after 28 weeks confirming that the pregnancy is progressing normally

Surgery

- travel should be avoided for 10 days following abdominal surgery
- laparoscopic surgery: after 24 hours

- colonoscopy: after 24 hours
- following the application of a plaster cast, the majority of airlines restrict flying for 24 hours on flights of less than 2 hours or 48 hours for longer flights

Haematological disorders

- patients with a haemoglobin of greater than 8 g/dl may travel without problems (assuming there is no coexisting condition such as cardiovascular or respiratory disease)

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How long should a patient stop driving for following a stroke?

<input type="radio"/>	A. No restriction unless physical/visual impairment
<input checked="" type="radio"/>	B. 1 month
<input type="radio"/>	C. 3 month
<input type="radio"/>	D. 6 months
<input type="radio"/>	E. 12 months

DVLA advice post stroke or TIA: cannot drive for 1 month

DVLA: neurological disorders

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**if the tumour is a benign meningioma and there is no seizure history, licence can be reconsidered 6 months after surgery if remains seizure free

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Theme: DVLA: cardiovascular disorders

- | | |
|-----------|---------------------|
| A. | No restriction |
| B. | 1 week off driving |
| C. | 2 weeks off driving |
| D. | 4 weeks off driving |
| E. | 6 weeks off driving |

- F. 2 months off driving
- G. 3 months off driving
- H. No restriction but inform DVLA

For each of the following scenarios select the most appropriate advice regarding driving a car:

82. A 71-year-old man has just had a permanent pacemaker insertion

You answered No restriction but inform DVLA


The correct answer is 1 week off driving

83. A 61-year-old man has an uneventful coronary artery bypass graft

You answered 3 months off driving

The correct answer is 4 weeks off driving

84. An implantable cardioverter-defibrillator has just been inserted into a patient with hypertrophic obstructive cardiomyopathy who has never had a ventricular arrhythmia

 4 weeks off driving

DVLA: cardiovascular disorders

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- heart transplant: DVLA do not need to be notified

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Theme: Evidenced-based recovery times

A.	Less than 1 week
B.	1 - 2 weeks
C.	2 - 3 weeks
D.	4 - 5 weeks
E.	7 weeks
F.	9 weeks
G.	3 months

For each one of the following procedures select the most appropriate recovery time for a person of working age:

122. Abdominal hysterectomy

You answered 3 months

The correct answer is 7 weeks

123. Laparoscopic inguinal hernia repair

✓ 1 - 2 weeks

124. Laparoscopic cholecystectomy

You answered 4 - 5 weeks

The correct answer is 2 - 3 weeks

Evidenced-based recovery times

The Department for Works and Pensions has produced evidence-based recovery times which certifying medical practitioners should consider when advising patients of working age

Procedure	Recovery time	
	Laparoscopic	Open
Abdominal/groin hernia	1 - 2 weeks	2 - 3 weeks
Appendicectomy	1 - 2 weeks	2 - 3 weeks
Cholecystectomy	2 - 3 weeks	3 - 5 weeks
Hysterectomy	3 weeks (laparoscopic-assisted vaginal)	7 weeks (abdominal)

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Next

A pregnant woman asks for advice about flying. What is the latest time in her pregnancy that she may fly, presuming an uncomplicated pregnancy with no change in the estimated date of delivery?

☐ A. 24 weeks

☐ B. 28 weeks

☐ C. 32 weeks

 ☒ D. 36 weeks

☐ E. 38 weeks

Fitness to fly - pregnancy - up to 36 weeks

Fitness to fly

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Haematological disorders

- patients with a haemoglobin of greater than 8 g/dl may travel without problems (assuming there is no coexisting condition such as cardiovascular or respiratory disease)

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Theme: Consultation models

- | | |
|----|---------------------|
| A. | Heron |
| B. | Byrne and Long |
| C. | Berne |
| D. | Fraser |
| E. | Neighbour |
| F. | Calgary-Cambridge |
| G. | Stott and Davis |
| H. | Helman's folk model |
| I. | Pendleton |

For each of the following tasks select the consultation model most associated with it

182. Anticipatory care

You answered Heron

The correct answer is Fraser

183. Modification of help-seeking behaviour

You answered Heron

The correct answer is Stott and Davis

184. Giving information, explaining and planning

You answered Heron

The correct answer is Calgary-Cambridge

Consultation models

Calgary-Cambridge observation guide- Kurtz and Silverman - 1996

- initiating the session
- gathering information
- building the relationship
- giving information, explaining and planning
- closing the session

Stewart - patient-centred clinical method - 1995, 2003

- exploring both the disease and the illness experience
- understanding the whole person

- finding common ground
- incorporating prevention and health promotion
- enhancing the doctor-patient relationship
- being realistic (with time and resources)

Pendleton - The Consultation: an Approach to Learning and Teaching - 1984, 2003

- define the reason for the patient's attendance (ideas, concerns and expectations)
- consider other problems
- with the patient, choose an appropriate action for each problem
- achieve a shared understanding of the problems with the patient
- involve the patient in the management and encourage him/her to accept appropriate responsibility
- use time and resources appropriately
- establish or maintain a relationship with the patient which helps to achieve the other tasks

Fraser - Areas of competence - 1992

- interviewing and history-taking
- physical examination
- diagnosis and problem-solving
- patient management
- relating to patients
- anticipatory care
- record keeping

Neighbour - The Inner Consultation - five checkpoint model - 1987

- connecting
- summarising
- handing over
- safety netting
- housekeeping

Tuckett - meeting of two experts - 1985

- the consultation is a meeting between two experts
- doctors are experts in medicine

- patients are experts in their own illnesses
- shared understanding is the aim
- doctors should seek to understand the patient's beliefs
- doctors should address explanations in terms of the patient's belief system

Stott and Davis - Exceptional potential of the consultation - 1979

- management of presenting problems
- management of continuing problems
- modification of help-seeking behaviour
- opportunistic health promotion

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Next

A 55-year-old man is admitted following an anterior myocardial infarction. Which of the following drugs is least likely to reduce mortality in the long-term?

- ☐ A. Atorvastatin
- ☐ B. Atenolol
- ☐ C. Ramipril
- ☐ D. Aspirin
- ☒ E. Isosorbide mononitrate

Next question

Isosorbide mononitrate may be important in managing symptoms yet it has no proven mortality benefit following a myocardial infarction

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly' breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be

used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

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Next

A 71-year-old woman is reviewed in her local GP surgery. She has recently changed practices and is having a routine new patient medical. Her blood pressure is 146/94 mmHg. This is confirmed on a second reading. In line with recent NICE guidance, what is the most appropriate management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Ask her to come back in 6 months for a blood pressure check |
| <input type="radio"/> | B. Arrange 3 blood pressure checks with the practice nurse over the next 2 weeks with medical review following |
| <input checked="" type="radio"/> | C. Arrange ambulatory blood pressure monitoring |
| <input type="radio"/> | D. Reassure her this is acceptable for her age |
| <input type="radio"/> | E. Start treatment with a calcium channel blocker |

Hypertension - NICE now recommend ambulatory blood pressure monitoring to aid diagnosis

The 2011 NICE guidelines recognise that in the past there was overtreatment of 'white coat' hypertension. The use of ambulatory blood pressure monitoring (ABPM) aims to reduce this. There is also good evidence that ABPM is a better predictor of cardiovascular risk than clinic blood pressure readings. See the following study for more details:

Verdecchia P. Prognostic value of ambulatory blood pressure: current evidence and clinical implications. Hypertension 2000; 35: 844-851

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a phaeochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

قراءتين كل ساعة خلال فترة الاستيقاظ

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

متوسط 14 قراءة

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

صباحا ومساء يوميا لمدة سبع ايام
تعداد كل مرة مرتين بفارق دقيقة

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

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Next

A 54-year-old male with no past medical history is found to be in atrial fibrillation during a consultation regarding a sprained ankle. He reports no history of palpitations or dyspnoea. After discussing treatment options he elects not to be cardioverted. According to the latest European

Society of Cardiology guidelines, if the patient remains in **chronic atrial fibrillation** what is the most suitable treatment to offer?



- ☒ A. No treatment
- ☐ B. Warfarin
- ☐ C. Dabigatran
- ☐ D. Aspirin + dipyridamole
- ☐ E. Aspirin

Next question

Young man with AF, no TIA or risk factors, no treatment is now preferred to aspirin

The European Society of Cardiology guidelines suggest that 'no treatment is preferred to aspirin' for low risk patients such as this man.

Atrial fibrillation: anticoagulation

The European Society of Cardiology published updated guidelines on the management of atrial fibrillation in 2012. They suggest using the **CHA₂DS₂-VASc** score to determine the most appropriate anticoagulation strategy. This scoring system superceded the CHADS₂ score.

	Risk factor	Points
C	Congestive heart failure	1
H	Hypertension (or treated hypertension)	1
A₂	Age >= 75 years	2
	Age 65-74 years	1
D	Diabetes	1
S₂	Prior Stroke or TIA	2

	Risk factor	Points
V	Vascular disease (including ischaemic heart disease and peripheral arterial disease)	1
S	Sex (female)	1

The table below shows a suggested anticoagulation strategy based on the score:

Score	Anticoagulation
0	No treatment
1	Males: Consider anticoagulation Females: No treatment
2 or more	Offer anticoagulation

Doctors have always thought carefully about the risk/benefit profile of starting someone on warfarin. A history of falls, old age, alcohol excess and a history of previous bleeding are common things that make us consider whether warfarinisation is in the best interests of the patient. NICE now recommend we formalise this risk assessment using the HASBLED scoring system.

	Risk factor	Points
H	Hypertension uncontrolled, systolic BP > 160 mmHg	1
A	Abnormal renal function (dialysis or creatinine > 200) Or Abnormal liver function (cirrhosis, bilirubin > 2 times normal, ALT/AST/ALP > 3 times normal)	1 for any renal abnormalities 1 for any liver abnormalities
S	Stroke, history of	1
B	Bleeding, history of bleeding or tendency to bleed	1
L	Labile INRs (unstable/high INRs, time in therapeutic range < 60%)	1
E	Elderly (> 65 years)	1
D	Drugs Predisposing to Bleeding (Antiplatelet agents, NSAIDs)	1 for drugs

	Risk factor	Points
	Or Alcohol Use (>8 drinks/week)	1 for alcohol

Question 4 of 156

Next

A 65 year old female with a known history of heart failure presents to her GP for an annual check-up. She is found to have a blood pressure of 170/100 mmHg. Her current medications are furosemide and aspirin. What is the most appropriate medication to add?

- ☐ A. Bendroflumethiazide
- ☐ B. Spironolactone
- ☐ C. Bisoprolol
- ☐ D. Verapamil
- ☒ E. Enalapril

Next question

Both enalapril and bisoprolol have been shown to improve prognosis in patients with heart failure. Enalapril however would also be better at treating the hypertension. NICE guidelines recommend the introduction of an ACE inhibitor prior to a beta-blocker in patients with chronic heart failure

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- | IMPROVE mortality in heart failure | |
|---|--|
| • ACE inhibitors (SAVE, SOLVD, CONSENSUS) | ACEI improve mortality after myocardial infarction |
| • spironolactone (RALES) | ASPRIN |
| • beta-blockers (CIBIS) | BBLOCKER |
| • hydralazine with nitrates (VHEFT-1) | STATN |

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered
- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine

*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 5 of 156

Next

You review a patient who has been admitted with a non-ST elevation myocardial infarction in the Emergency Department. They have so far been treated with aspirin 300mg stat and glyceryl trinitrate spray (2 puffs). Following recent NICE guidance, which patients should receive clopidogrel?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Patients < 75 years of age |
| <input type="radio"/> | B. Patients who have a history of hypertension, ischaemic heart disease or diabetes mellitus |
| <input type="radio"/> | C. Those who have a predicted 12 month mortality > 10% |
| <input type="radio"/> | D. Those who have a predicted 6 month mortality < 10% |
| <input checked="" type="radio"/> | E. All patients |

The 2013 NICE myocardial infarction guidelines replaced the 2010 advice - risk scores are no longer needed to determine whether clopidogrel is given.

Acute coronary syndrome: management of NSTEMI

NICE produced guidelines in 2013 on the *Secondary prevention in primary and secondary care for patients following a myocardial infarction management of unstable angina and non-ST elevation myocardial infarction (NSTEMI)*. These superseded the 2010 guidelines which advocated a risk-based approach to management which determined whether drugs such as clopidogrel were given.

All patients should receive

- aspirin 300mg
- nitrates or morphine to relieve chest pain if required

Whilst it is common that non-hypoxic patients receive oxygen therapy there is little evidence to support this approach. The 2008 British Thoracic Society oxygen therapy guidelines advise not giving oxygen unless the patient is hypoxic.

Antithrombin treatment. Fondaparinux should be offered to patients who are not at a high risk of bleeding and who are not having angiography within the next 24 hours. If angiography is likely within 24 hours or a patient's creatinine is $> 265 \mu\text{mol/l}$ unfractionated heparin should be given.

Clopidogrel 300mg should be given to all patients and continued for 12 months.

Intravenous **glycoprotein IIb/IIIa receptor antagonists** (eptifibatide or tirofiban) should be given to patients who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%), and who are scheduled to undergo angiography within 96 hours of hospital admission.

Coronary angiography should be considered within 96 hours of first admission to hospital to patients who have a predicted 6-month mortality above 3.0%. It should also be performed as soon as possible in patients who are clinically unstable.

The table below summarises the mechanism of action of drugs commonly used in the management of acute coronary syndrome:


Medication	Mechanism of action
------------	---------------------

Medication	Mechanism of action
Aspirin	Antiplatelet - inhibits the production of thromboxane A2
Clopidogrel	Antiplatelet - inhibits ADP binding to its platelet receptor
Enoxaparin	Activates antithrombin III, which in turn potentiates the inhibition of coagulation factors Xa
Fondaparinux	Activates antithrombin III, which in turn potentiates the inhibition of coagulation factors Xa
Bivalirudin	Reversible direct thrombin inhibitor

Question 6 of 156

Next

You review a 62-year-old man who has recently been discharged from hospital in Hungary following a myocardial infarction. He brings a copy of an echocardiogram report which shows his left ventricular ejection fraction is 38%. On examination his pulse is 78 / min and regular, blood pressure is 124 / 72 mmHg and his chest is clear. His current medications include aspirin, simvastatin and lisinopril. What is the most appropriate next step in terms of his medication?

- ☐ A. Add atenolol
- ☐ B. Add furosemide
-  ☒ C. Add bisoprolol
- ☐ D. Add isosorbide mononitrate
- ☐ E. Make no changes

Next question

Both carvedilol and bisoprolol have been shown to reduce mortality in stable heart failure. The other beta-blockers have no evidence base to support their use.

NICE recommend that all heart failure patients should take both an ACE-inhibitor and a beta-blocker.

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- ACE inhibitors (SAVE, SOLVD, CONSENSUS)
- spironolactone (RALES)
- beta-blockers (CIBIS)
- hydralazine with nitrates (VHEFT-1)

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

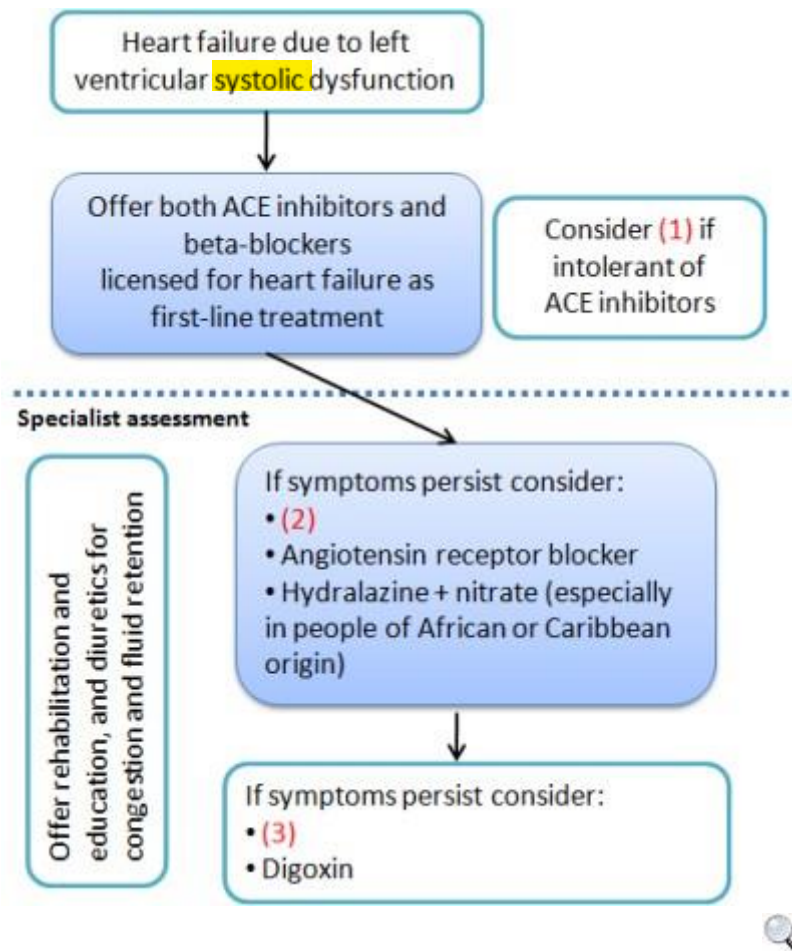
- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered
- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine

*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 7-9 of 156

Theme: NICE heart failure guidelines



- A. Loop diuretic
- B. Implantable cardioverter defibrillator
- C. Cardiac resynchronisation therapy
- D. Aldosterone antagonist
- E. Angiotensin receptor blocker
- F. Hydralazine + nitrate
- G. Beta-blocker
- H. Amiodarone

I. Calcium channel blocker

J. Digoxin

The diagram below is taken from the NICE guidelines on the management of heart failure:

7. Gap (1)

The correct answer is Angiotensin receptor blocker

8. Gap (2)

The correct answer is Aldosterone antagonist

9. Gap (3)

The correct answer is Cardiac resynchronisation therapy

Next question

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

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**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 10 of 156

Next

An 82-year-old man presents to his GP surgery with shortness-of-breath. He has a history of type 2 diabetes mellitus (tablet controlled) and colon cancer for which he had a right hemicolectomy seven years ago. He started to feel breathless around two weeks ago and only has an occasional non-productive cough. There is no chest pain. On examination his chest is clear, blood pressure is 156/88 mmHg, respiratory rate is 18/min and pulse 96/min. An ECG is taken whilst he is at surgery:



What diagnosis does the ECG suggest?

- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Left bundle branch block |
| <input type="radio"/> | B. Pericarditis |
| <input checked="" type="radio"/> | C. Myocardial infarction |
| <input type="radio"/> | D. Pulmonary embolism |
| <input type="radio"/> | E. Left ventricular hypertrophy |

Next question

This patient has massive ST elevation with associated hyperacute T waves in the anterior leads suggestive of an ongoing myocardial infarction (MI). Both the patient's age and diabetes puts them at risk of a silent MI. This patient obviously requires aspirin 300mg stat (provided there are no contraindications) and immediate transfer to hospital.

ECG: myocardial ischaemia

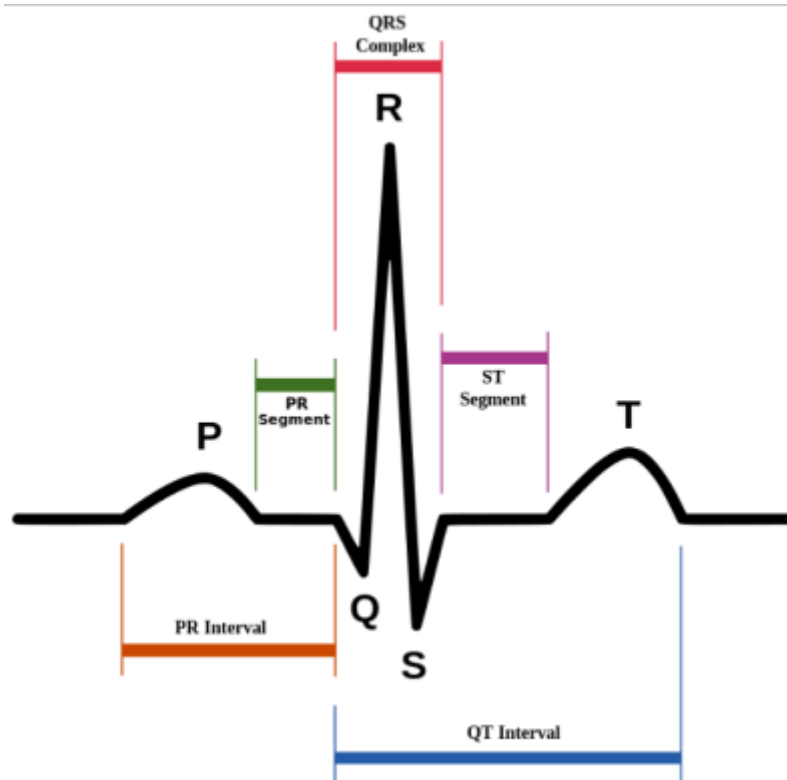
One of the main uses of the ECG is to determine whether a patient is having a cardiac event in the context of chest pain. A wide variety of changes can be seen depending on what type of ischaemic event is happening, where it is happening and when it happened.

Acute myocardial infarction (MI)

- hyperacute T waves are often the first sign of MI but often only persists for a few minutes
- ST elevation may then develop
- the T waves typically become inverted within the first 24 hours. The inversion of the T waves can last for days to months
- pathological Q waves develop after several hours to days. This change usually persists indefinitely

Definition of ST elevation*

- new ST elevation at the J-point in two contiguous leads with the cut-off points: ≥ 0.2 mV in men or ≥ 0.15 mV in women in leads V2-V3 and/or ≥ 0.1 mV in other leads



*Thygesen K et al. Universal definition of myocardial infarction. Circulation 2007 Nov 27; 116(22) 2634-53. doi:10.1161/CIRCULATIONAHA.107.187397 pmid:17951284

Question 11 of 156

Next

A 72-year-old man presents with lethargy and palpitations for the past four or five days. On examination his pulse is 123 bpm irregularly irregular, blood pressure is 128/78 mmHg and his chest is clear. An ECG confirms atrial fibrillation. What is the appropriate drug to **control his heart rate**?

- ☐ A. Amiodarone rhythm control
- ✓ ☒ B. Atenolol or bisoprolol
- ☐ C. Digoxin better if heart failure present
- ☐ D. Amlodipine not recommended
- ☐ E. Flecainide rhythm control

Atrial fibrillation: rate control - beta blockers preferable to digoxin

A number of factors including age and symptoms would favour a rate control strategy. The NICE guidelines suggest either a beta-blocker or a rate limiting calcium channel blocker (i.e. Not amlodipine) in this situation. Some clinicians would prefer to use a more cardio-selective beta-blocker such as bisoprolol, although this is not stipulated in current guidelines

Atrial fibrillation: **rate control** and maintenance of sinus rhythm

The Royal College of Physicians and NICE published guidelines on the management of atrial fibrillation (AF) in 2006. The following is also based on the joint American Heart Association (AHA), American College of Cardiology (ACC) and European Society of Cardiology (ESC) 2012 guidelines

Agents used to control rate in patients with atrial fibrillation

- beta-blockers
- calcium channel blockers
- digoxin (not considered first-line anymore as they are less effective at controlling the heart rate during exercise. However, they are the preferred choice if the patient has coexistent heart failure)

Agents used to maintain sinus rhythm in patients with a history of atrial fibrillation

- sotalol
- amiodarone
- flecainide
- others (less commonly used in UK): disopyramide, dofetilide, procainamide, propafenone, quinidine

The table below indicates some of the factors which may be considered when considering either a rate control or rhythm control strategy

Factors favouring rate control	Factors favouring rhythm control
Older than 65 years	Younger than 65 years

History of ischaemic heart disease	Symptomatic First presentation Lone AF or AF secondary to a corrected precipitant (e.g. Alcohol) Congestive heart failure
------------------------------------	--

Question 12 of 156

Next

A 58-year-old man with no past medical history of note is admitted to hospital with crushing central chest pain. ECG on arrival shows anterior ST elevation and he is subsequently thrombolysed with a good resolution of symptoms and ECG changes. Four weeks following the event, which combination of drugs should he be taking?

- ☐ A. ACE inhibitor + beta-blocker + statin + aspirin
- ☐ B. Spironolactone + beta-blocker + statin + aspirin
- ☒ C. ACE inhibitor + beta-blocker + statin + aspirin + clopidogrel
- ☐ D. ACE inhibitor + statin + aspirin + clopidogrel
- ☐ E. Beta-blocker + statin + aspirin + clopidogrel

Next question

NICE made the following recommendation in 2013 relating to people who have had a STEMI and medical management with or without reperfusion treatment with a fibrinolytic agent

- offer clopidogrel as a treatment option for at least 1 month and consider continuing for up to 12 months

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g. sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

Question 13 of 156

Next

You are considering prescribing enalapril for a patient with newly diagnosed heart failure. Which one of the following best describes the most characteristic side-effects of angiotensin-converting enzyme inhibitors?

- ☐ A. Cough + reflex tachycardia + nephrotoxicity
- ✓ ☒ B. Cough + anaphylactoid reactions + hyperkalaemia
- ☐ C. Cough + erythema multiforme + hyponatraemia
- ☐ D. Cough + reflex tachycardia + hyperkalaemia
- ☐ E. Cough + erythema multiforme + hyperkalaemia

Next question

Angiotensin-converting enzyme inhibitors

Angiotensin-converting enzyme (ACE) inhibitors are now the established first-line treatment in younger patients with hypertension and are also extensively used to treat heart failure. They are known to be less effective in treating hypertensive Afro-Caribbean patients. ACE inhibitors are also used to treat diabetic nephropathy and have a role in secondary prevention of ischaemic heart disease.

Mechanism of action:

- inhibit the conversion angiotensin I to angiotensin II

Side-effects:

- cough: occurs in around 15% of patients and may occur up to a year after starting treatment. Thought to be due to increased bradykinin levels
- angioedema: may occur up to a year after starting treatment
- hyperkalaemia
- first-dose hypotension: more common in patients taking diuretics

Cautions and contraindications

- pregnancy and breastfeeding - avoid
- renovascular disease - significant renal impairment may occur in patients who have undiagnosed bilateral renal artery stenosis
- aortic stenosis - may result in hypotension
- patients receiving high-dose diuretic therapy (more than 80 mg of furosemide a day) - significantly increases the risk of hypotension
- hereditary of idiopathic angioedema

Monitoring

- urea and electrolytes should be checked before treatment is initiated and after increasing the dose
- a rise in the creatinine and potassium may be expected after starting ACE inhibitors. Acceptable changes are an increase in serum creatinine, up to 30%* from baseline and an increase in potassium up to 5.5 mmol/l*.

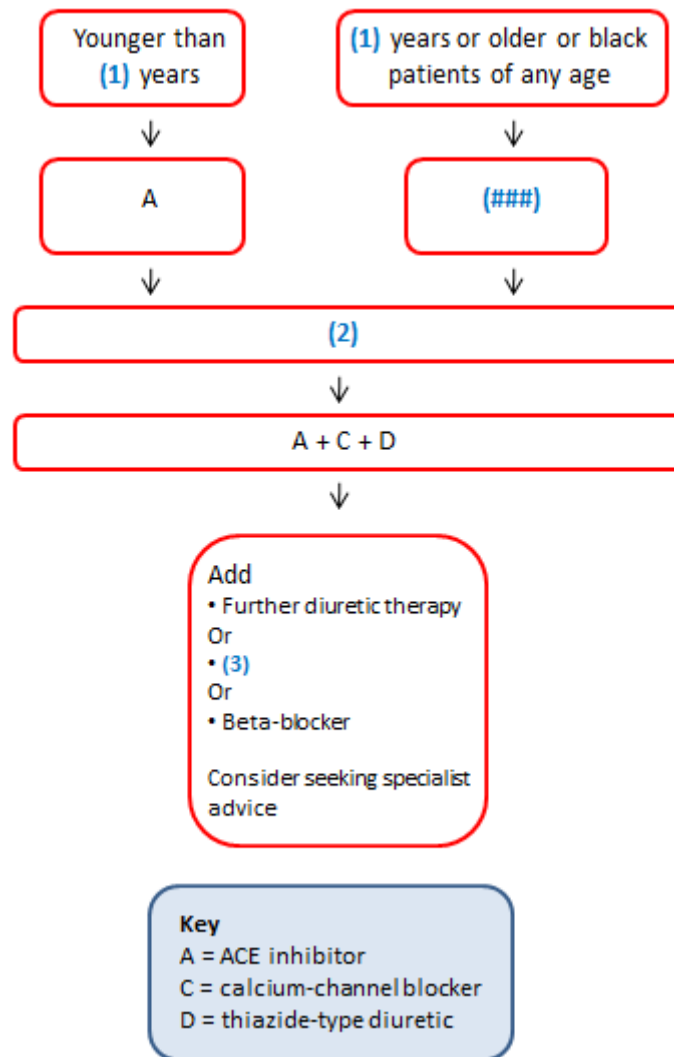
*Renal Association UK, Clinical Knowledge Summaries quote 50% which seems rather high. SIGN advise that the fall in eGFR should be less than 20%. The NICE CKD guidelines suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable

1 / 3

Question 14-16 of 156

Next

Theme: NICE hypertension guidelines



- A. 55
- B. 60
- C. 65
- D. A + C
- E. A + D or C + D

- F.** A + C or A + D
- G.** Switch to angiotensin 2 receptor blocker
- H.** Alpha blocker
- I.** Centrally acting hypertensive
- J.** Direct renin inhibitor

The diagram below is taken from the NICE guidelines on the management of hypertension:

14. Gap (1)

✓ 55

15. Gap (2)

The correct answer is A + C

16. Gap (3)

The correct answer is Alpha blocker

[Next question](#)

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides

- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55-years-old: ACE inhibitor (A)
- patients > 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 17 of 156

Next

A 52-year-old man is seen in the hypertension clinic. He was diagnosed around three months ago and started on ramipril. This has been titrated up to 10mg od but his blood pressure remains around 156/92 mmHg. What is the most appropriate next step in management?

- ☐ A. Add bendroflumethiazide
- ☐ B. Add bisoprolol
- ☐ C. Switch ramipril to perindopril
- ☒ D. Add amlodipine
- ☐ E. Add losartan

Next question

Calcium channel blockers are now preferred to thiazides in the treatment of hypertension

The 2011 NICE guidelines reflected the changing evidence base supporting the use of calcium channel blockers in preference to thiazide-type diuretics in the management of hypertension.

The April 2012 AKT feedback report commented: *'Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.'*

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
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- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

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For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
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- ACE inhibitor + calcium channel blocker (A + C)

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*BMJ 2013;346:f1325

Question 18-20 of 156

Next

Theme: Hypertension: secondary causes

- | | |
|-----------|---------------------------------|
| A. | Adult polycystic kidney disease |
| B. | Cushing's syndrome |
| C. | Congenital adrenal hyperplasia |
| D. | Primary hyperaldosteronism |
| E. | Phaeochromocytoma |
| F. | Acromegaly |
| G. | Bartter's syndrome |
| H. | Medication-induced |
| I. | Renal artery stenosis |
| J. | Pregnancy-induced hypertension |

For each one of the following select the most likely diagnosis:

- 18.** A 28-year-old who is 10 weeks pregnant is noted to be hypertensive on her booking visit. Blood show a potassium of 3.1 mmol/l. Clinical examination is unremarkable

The correct answer is Primary hyperaldosteronism

At 10 weeks gestation pregnancy-induced hypertension is not a possibility. The booking visit may represent the first time this patient has had her blood pressure checked, revealing an long-standing disorder. The low potassium points to a diagnosis of primary hyperaldosteronism (of which Conn's

syndrome is a subtype)

19. A 39-year-old man presents with headaches and excessive sweating. He also reports some visual loss. Visual fields testing reveal loss of temporal vision on the right side.

The correct answer is Acromegaly

Features of acromegaly include:

- coarse facial appearance, spade-like hands, increase in shoe size
 - large tongue, prognathism, interdental spaces
 - excessive sweating and oily skin
 - features of pituitary tumour: hypopituitarism, headaches, bitemporal hemianopia
20. A 68-year-old with a history of ischaemic heart disease is seen in the hypertension clinic. Despite four antihypertensives his blood pressure is 172/94 mmHg. An abdominal ultrasound shows asymmetrical kidneys

The correct answer is Renal artery stenosis

[Next question](#)

Hypertension: secondary causes

It is thought that between 5-10% of patients diagnosed with hypertension have **primary hyperaldosteronism**, including Conn's syndrome. This makes it the single most common cause of secondary hypertension.

Renal disease accounts for a large percentage of the other cases of secondary hypertension. Conditions which may increase the blood pressure include:

- glomerulonephritis
- pyelonephritis
- adult polycystic kidney disease
- renal artery stenosis

Endocrine disorders (other than primary hyperaldosteronism) may also result in increased blood pressure:

- phaeochromocytoma
- Cushing's syndrome
- Liddle's syndrome
- congenital adrenal hyperplasia (11-beta hydroxylase deficiency)
- acromegaly

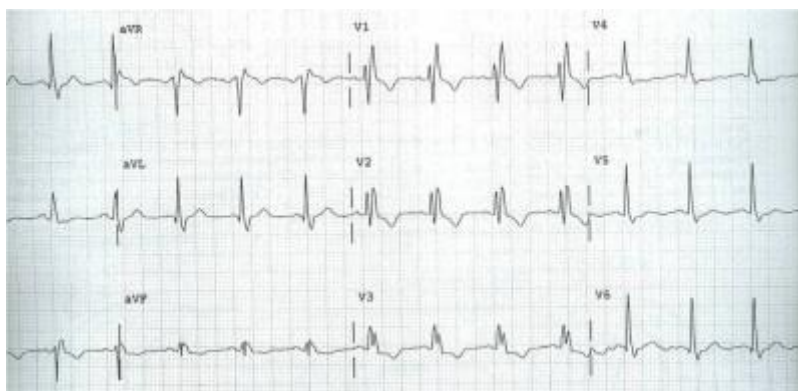
Other causes include:

- NSAIDs
- pregnancy
- coarctation of the aorta
- the combined oral contraceptive pill
- steroids
- MAOI

Question 21 of 156

Next

A 55-year-old man complains of palpitations. Examination of his cardiorespiratory system is unremarkable. A resting ECG is therefore ordered prior to arranging a 24-hour tape.



What is shown on the ECG?

- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Normal ECG |
| <input type="radio"/> | B. Wolff-Parkinson White syndrome |
| <input checked="" type="radio"/> | C. Right bundle branch block |
| <input type="radio"/> | D. Left bundle branch block |
| <input type="radio"/> | E. Recent myocardial infarction |

[Next question](#)

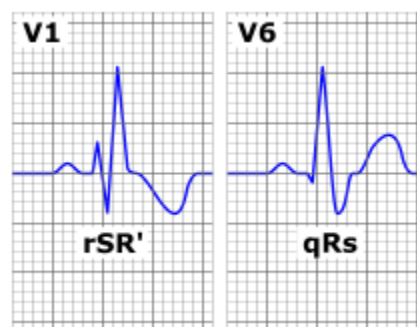
The following features can be seen on this ECG:

- broad QRS > 120 ms
- rSR' pattern in V1-3 ('M' shaped QRS complex)
- wide, slurred S wave in the lateral leads (aVL, V5-6)

It is therefore diagnostic of right bundle branch block.

ECG: right bundle branch block

Right bundle branch block is a common feature seen on ECGs.



One of the most common ways to remember the difference between LBBB and RBBB is WiLLiaM MaRRoW

- in LBBB there is a 'W' in V1 and a 'M' in V6
- in RBBB there is a 'M' in V1 and a 'W' in V6

Causes of RBBB

- normal variant - more common with increasing age
- right ventricular hypertrophy
- chronically increased right ventricular pressure - e.g. cor pulmonale
- pulmonary embolism
- myocardial infarction
- atrial septal defect
- cardiomyopathy or myocarditis

Question 22-24 of 156

Next

Theme: Angina pectoris: drug management

- | | |
|----|------------------------|
| A. | Verapamil |
| B. | Amlodipine |
| C. | Nifedipine |
| D. | Atenolol |
| E. | Nicorandil |
| F. | Isosorbide mononitrate |
| G. | Simvastatin |
| H. | Aspirin |
| I. | Ramipril |

For each one of the following please select the correct answer from the options listed above:

22. Patients may develop tolerance to this medication necessitating a change in dosing regime

The correct answer is Isosorbide mononitrate

23. Is the most appropriate first-line anti-anginal for stable angina if there are no contraindications

The correct answer is Atenolol

Aspirin and simvastatin should also be prescribed, but they are not anti-anginals.

24. Is contraindicated if a patient is already prescribed atenolol

✓ Verapamil

This would risk complete heart block.

Next question

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'
- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa

- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

Question 25 of 156

Next

A 74-year-old woman is reviewed. She recently had ambulatory blood pressure monitoring that showed an average reading of 142/90 mmHg. There is no significant past medical history of note other than hypothyroidism. Her 10-year cardiovascular risk score is 23%. What is the most appropriate management?

- ✓ ☒ A. Start amlodipine
- ☐ B. Start bendroflumethiazide
- ☐ C. No treatment required - monitor blood pressure every year

- ☐ D. Start ramipril
- ☐ E. Repeat ambulatory blood pressure monitoring

Next question

The average reading is above the treatment threshold for patients below the age of 80 years. Treatment with a calcium channel blocker should therefore be started.

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)

- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP $\geq 140/90$ mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

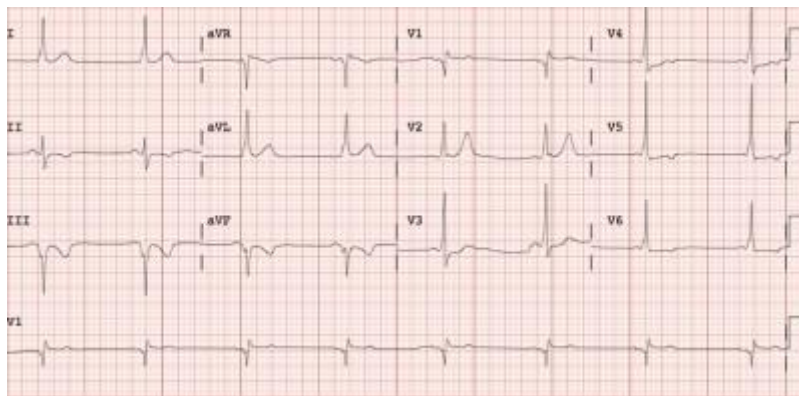
- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists

- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 26 of 156

Next

A 19-year-old man presents with a history of palpitations. These typically occur after exercise. During these episodes his heart beat feels fast and regular. On one occasion he describes feeling light-headed like he may pass out. You arrange a 12 lead ECG:



What is the most likely diagnosis?

- ✓ ☒ A. Wolff-Parkinson White
- ☐ B. Hypertrophic obstructive cardiomyopathy
- ☐ C. Arrhythmogenic right ventricular cardiomyopathy
- ☐ D. Brugada syndrome
- ☐ E. Pulmonary embolism

Next question

The ECG shows a short PR interval associated with a slurred upstroke (delta wave). Note the non-

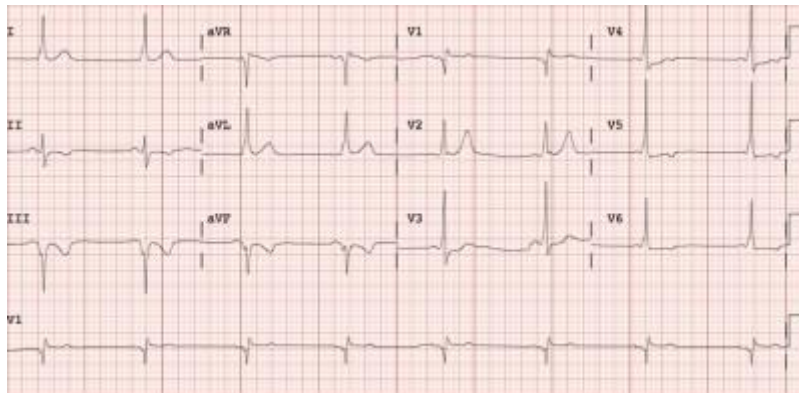
specific ST-T changes which are common in Wolff-Parkinson White and may be mistaken for ischaemia.

Wolff-Parkinson White

Wolff-Parkinson White (WPW) syndrome is caused by a congenital accessory conducting pathway between the atria and ventricles leading to a atrioventricular re-entry tachycardia (AVRT). As the accessory pathway does not slow conduction AF can degenerate rapidly to VF

Possible ECG features include:

- short PR interval
- wide QRS complexes with a slurred upstroke - 'delta wave'
- left axis deviation if right-sided accessory pathway*
- right axis deviation if left-sided accessory pathway*



© Image used on license from [Dr Smith, University of Minnesota](#)

ECG showing short PR interval associated with a slurred upstroke (delta wave). Note the non-specific ST-T changes which are common in WPW and may be mistaken for ischaemia. The left axis deviation means that this is type B WPW, implying a right-sided pathway



© Image used on license from [Dr Smith, University of Minnesota](#)

Further example showing a characteristic delta wave

Differentiating between type A and type B

- type A (left-sided pathway): dominant R wave in V1
- type B (right-sided pathway): no dominant R wave in V1

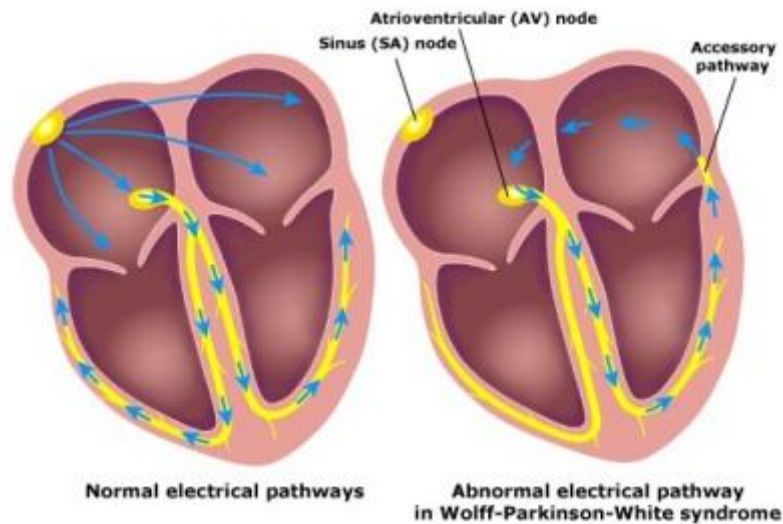


Image sourced from [Wikipedia](#)



Associations of WPW

- HOCM
- mitral valve prolapse
- Ebstein's anomaly
- thyrotoxicosis
- secundum ASD

Management

- definitive treatment: radiofrequency ablation of the accessory pathway
- medical therapy: sotalol**, amiodarone, flecainide

*in the majority of cases, or in a question without qualification, Wolff-Parkinson-White syndrome is associated with left axis deviation

****sotalol should be avoided if there is coexistent atrial fibrillation as prolonging the refractory period at the AV node may increase the rate of transmission through the accessory pathway, increasing the ventricular rate and potentially deteriorating into ventricular fibrillation**

Question 27 of 156

[Next](#)

A 72-year-old man with a history of chronic heart failure secondary to ischaemic cardiomyopathy is reviewed. He was discharged two weeks ago from hospital following a myocardial infarction. An echocardiogram done during his admission showed a left ventricular ejection fraction of 40% but did not demonstrate any valvular problems.

Despite his current treatment with furosemide, ramipril, carvedilol, aspirin and simvastatin he remains short of breath on minimal exertion such as walking 30 metres. On examination his chest is clear and there is minimal peripheral oedema. What is the most appropriate next step in management?

- ☐ A. Stop aspirin
- ☐ B. Refer for cardiac resynchronisation therapy
- ☐ C. Switch carvedilol to bisoprolol
- ☐ D. Add angiotensin-2 receptor blocker
- ☒ E. Add an aldosterone antagonist

[Next question](#)

The updated 2010 NICE guidelines now suggest that in addition to aldosterone antagonists both angiotensin-2 receptor blockers and hydralazine in combination with a nitrate are suitable second-line treatments for heart failure. However, given that he has had a recent myocardial infarction the best choice is an aldosterone antagonist - please see the NICE guidelines for more details.

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- ACE inhibitors (SAVE, SOLVD, CONSENSUS)
- spironolactone (RALES)
- beta-blockers (CIBIS)
- hydralazine with nitrates (VHEFT-1)

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered
- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine


*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 28 of 156

Next

A 65-year-old man comes for review. His latest blood pressure is 168/98 mmHg despite taking ramipril 10mg od, amlodipine 10mg od and indapamide 2.5mg od. As well as the antihypertensives he also takes aspirin 75mg od and metformin 1g bd for type 2 diabetes mellitus. He smokes 10 cigarettes/day, drinks around 20 units of alcohol per week. His body mass index is 34 kg/m². The most recent HbA1c has been reported as 66mmol/mol (DCCT - 8.2%). What is the most likely explanation for his persistently raised blood pressure?

- ☐ A. Long-term aspirin use
- ☐ B. His alcohol intake
- ☐ C. Poor glycaemic control
- ☐ D. Interaction of metformin with indapamide
-  ☒ E. His raised body mass index

Next question

A 2012 BMJ article (BMJ 2012;345:e7473) on resistant hypertension highlighted the importance of correcting lifestyle factors in patients with resistant hypertension. Only around 10% of patients with resistant hypertension have a secondary case, e.g. Conn's syndrome.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

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Severe	Clinic systolic BP ≥ 180 mmHg, or clinic diastolic BP ≥ 110 mmHg

Stage	Criteria
hypertension	

Managing hypertension

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For patients < 40 years consider specialist referral to exclude secondary causes.

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- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

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- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

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New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I

- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 29 of 156

Next

Which one of the following types of anti-anginal medication do patients commonly develop tolerance to?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Nifedipine |
| <input checked="" type="radio"/> | B. Standard release isosorbide mononitrate |
| <input type="radio"/> | C. Nicorandil |
| <input type="radio"/> | D. Verapamil |
| <input type="radio"/> | E. Modified release isosorbide mononitrate |

Next question

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'

- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

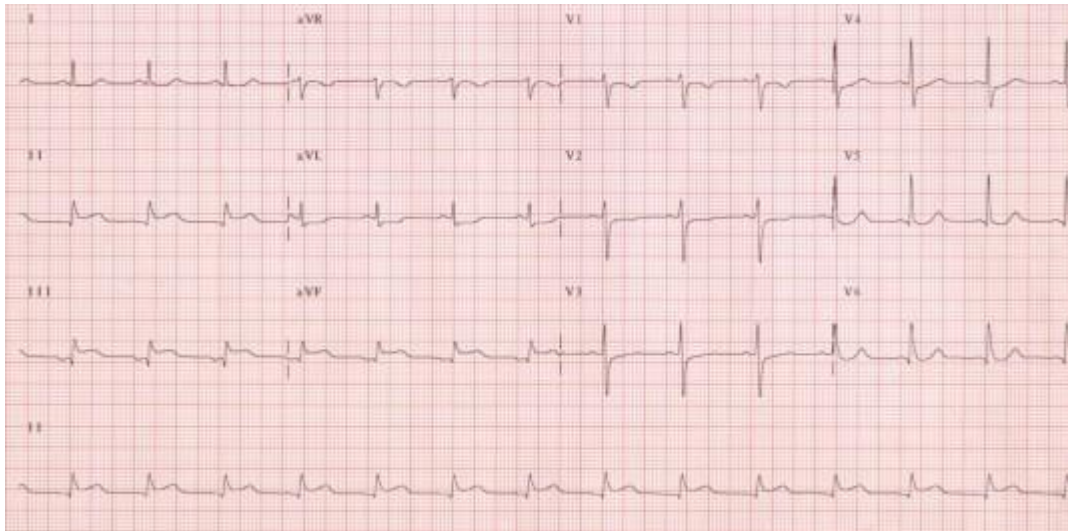
Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

Question 30 of 156

Next

A 62-year-old man with a history of diabetes mellitus presents to surgery complaining of a heavy feeling in his chest for the past 2 hours. An ECG is taken:



What is the most likely diagnosis?

- ☐ A. Posterior myocardial infarction
- ☐ B. Anterolateral myocardial infarction
- ☐ C. Incorrectly placed ECG leads
- ☐ D. Acute pericarditis
- ☒ E. Inferior myocardial infarction

Next question

ECG: coronary territories

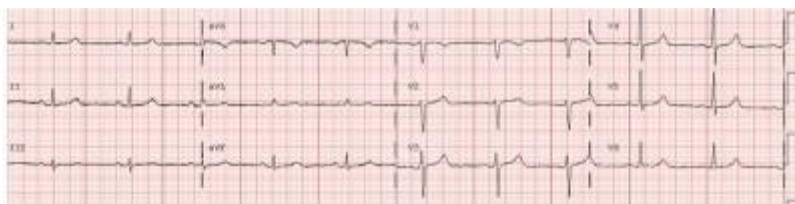
The table below shows the correlation between ECG changes and coronary territories:

	ECG changes	Coronary artery
Anteroseptal	V1-V4	Left anterior descending
Inferior	II, III, aVF	Right coronary
Anterolateral	V4-6, I, aVL	Left anterior descending or left circumflex
Lateral	I, aVL +/- V5-6	Left circumflex
Posterior	Tall R waves V1-2	Usually left circumflex, also right coronary

Question 31 of 156

Next

A 67-year-old woman complains of palpitations. Prior to arranging a 24-hour ECG you arrange a resting ECG:



© Image used on license from [Dr Smith, University of Minnesota](#)



What is shown on the ECG?

- ☐ A. First degree heart block
- ☒ B. Normal ECG
- ☐ C. Previous anterior myocardial infarction
- ☐ D. Previous inferior myocardial infarction
- ☐ E. Partial right bundle branch block

Next question

This ECG shows normal sinus rhythm with no diagnostic changes.

The May 2011 AKT feedback report stated: '*... candidates should remember that some of the items require them to recognise clinical or laboratory findings as normal.*'

ECG: normal variants

The following ECG changes are considered normal variants in an athlete:

- sinus bradycardia
- junctional rhythm
- first degree heart block
- Wenckebach phenomenon

Question 32 of 156

Next

A 13-year-old girl presents with recurrent attacks of collapse. These episodes typically occur without warning and have occurred whilst she is playing sport. There is no significant past medical history or family history of note. On examination she has an ejection systolic murmur. Blood pressure is 106/70 mmHg and pulse is 78/min. What is the most likely cause?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Ventricular septal defect |
| <input type="radio"/> | B. Aortic stenosis |
| <input type="radio"/> | C. Epilepsy with innocent murmur |
| <input checked="" type="radio"/> | D. Hypertrophic obstructive cardiomyopathy |
| <input type="radio"/> | E. Coarctation of the aorta |

Next question

Sudden death, unusual collapse in young person - ? HOCM

In this age group hypertrophic obstructive cardiomyopathy would be a more common cause of the murmur/recurrent collapse than aortic stenosis.

HOCM: features

Hypertrophic obstructive cardiomyopathy (HOCM) is an autosomal dominant disorder of muscle tissue caused by defects in the genes encoding contractile proteins. The most common defects involve a mutation in the gene encoding β -myosin heavy chain protein or myosin binding protein C. The estimated prevalence is 1 in 500.

Features

- often asymptomatic
- dyspnoea, angina, syncope
- sudden death (most commonly due to ventricular arrhythmias), arrhythmias, heart failure
- jerky pulse, large 'a' waves, double apex beat
- ejection systolic murmur: increases with Valsalva manoeuvre and decreases on squatting

Associations

- Friedreich's ataxia
- Wolff-Parkinson White

Echo - mnemonic - MR SAM ASH

- mitral regurgitation (MR)
- systolic anterior motion (SAM) of the anterior mitral valve leaflet
- asymmetric hypertrophy (ASH)

ECG

- left ventricular hypertrophy
- progressive T wave inversion
- deep Q waves

- atrial fibrillation may occasionally be seen



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ECG showing typical changes of HOCM including LVH and T wave inversion

Question 33 of 156

Next

A 65-year-old presents to surgery as she found her blood pressure to be high whilst using her husband's home blood pressure monitor. She has no history of note other than depression. You record a clinic reading of 160/96 mmHg in the right arm and 138/90 mmHg in the left arm. Cardiovascular examination is otherwise normal and she has no murmurs. You arrange a 24 hour blood pressure monitor to help clarify the diagnosis. Following NICE guidance, what other step should also be taken?

- ✓ ☒ A. Take all future clinic readings from the right arm
- ☐ B. Take all future clinic readings from the left arm
- ☐ C. Taken an average between the right and left arm readings for all future clinic readings
- ☐ D. Arrange a chest x-ray
- ☐ E. Arrange an echocardiogram

Next question

If there is a difference in BP reading between the arms all subsequent BPs should be recorded from the arm with the higher reading

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg

Stage	Criteria
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 34 of 156

Next

You are reviewing a 50-year-old woman who is complaining of exertional chest pain for the past six months. The pain typically eases when she rests and she has had no episodes of pain lasting more than three minutes. Clinical examination and resting ECG are normal. You arrange fasting blood tests. Following NICE guidelines, what is the most appropriate next step?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Give a trial of GTN spray |
| <input type="radio"/> | B. Arrange no further diagnostic tests and treat her as having angina |
| <input checked="" type="radio"/> | C. Calculate her estimated risk of having coronary artery disease |

- | | |
|-----------------------|--|
| <input type="radio"/> | D. Refer for an exercise tolerance test |
| <input type="radio"/> | E. Refer for a myocardial perfusion scan |

Next question

Chest pain: assessment of patients with suspected cardiac chest pain

NICE issued guidelines in 2010 on the 'Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin'.

Below is a brief summary of the key points. Please see the link for more details.

Patients presenting with acute chest pain

Immediate management of suspected acute coronary syndrome (ACS)

- glyceryl trinitrate
- aspirin 300mg. NICE do not recommend giving other antiplatelet agents (i.e. Clopidogrel) outside of hospital
- do not routinely give oxygen, only give if sats < 94%*
- perform an ECG as soon as possible but do not delay transfer to hospital. A normal ECG does not exclude ACS

Referral

- current chest pain or chest pain in the last 12 hours with an abnormal ECG: emergency admission
- chest pain 12-72 hours ago: refer to hospital the same-day for assessment
- chest pain > 72 hours ago: perform full assessment with ECG and troponin measurement before deciding upon further action

*NICE suggest the following in terms of oxygen therapy:

- do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:

- people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94-98%
- people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88-92% until blood gas analysis is available.

Patients presenting with stable chest pain

With all due respect to NICE the guidelines for assessment of patients with stable chest pain are rather complicated. They suggest an approach where the risk of a patient having coronary artery disease (CAD) is calculated based on their symptoms (whether they have typical angina, atypical angina or non-anginal chest pain), age, gender and risk factors.

NICE define anginal pain as the following:

- 1. constricting discomfort in the front of the chest, neck, shoulders, jaw or arms
- 2. precipitated by physical exertion
- 3. relieved by rest or GTN in about 5 minutes
- patients with all 3 features have typical angina
- patients with 2 of the above features have atypical angina
- patients with 1 or none of the above features have non-anginal chest pain

The risk tables are not reproduced here but can be found by clicking on the link.

If patients have typical anginal symptoms and a risk of CAD is greater than 90% then no further diagnostic testing is required. It should be noted that all men over the age of 70 years who have typical anginal symptoms fall into this category.

For patients with an estimated risk of 10-90% the following investigations are recommended. Note the absence of the exercise tolerance test:

Estimated likelihood of CAD	Diagnostic testing
61-90%	Coronary angiography
30-60%	Functional imaging, for example: <ul style="list-style-type: none"> • myocardial perfusion scan with SPECT • stress echocardiography • first-pass contrast-enhanced magnetic resonance (MR) perfusion

	<ul style="list-style-type: none"> MR imaging for stress-induced wall motion abnormalities.
10-29%	CT calcium scoring

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Next

You review a 54-year-old man in the hypertension clinic. His past medical history includes depression and peripheral arterial disease. He is currently prescribed aspirin, simvastatin, citalopram and co-codamol 8/500. Two weeks ago he was started on ramipril 1.25 mg od. His blood pressure has decreased from 160/100 mmHg to 114/ 72 mmHg and the creatinine has increased from 102 μ mol/l to 230 μ mol/l. Which one of the following is most likely to explain the rise in creatinine?

- ☐ A. Medication-induced urinary retention with secondary obstructive nephropathy
- ☐ B. Concurrent paracetamol overdose
- ☐ C. ACE-related glomerulonephritis
- ☐ D. Normal, acceptable rise in creatinine for patients taking an ACE inhibitor
- ☒ E. Underlying renovascular disease

Next question

Patients with bilateral renovascular disease (e.g. renal artery stenosis) may develop an acute kidney injury (AKI) if ACE inhibitors are administered. This is because elevated angiotensin II levels constrict the efferent arteriole more than the afferent arteriole within the kidney, which normally helps to maintain glomerular capillary pressure and filtration. Removing this constriction by blocking angiotensin II formation can cause an abrupt fall in glomerular filtration rate.

Angiotensin-converting enzyme inhibitors

Angiotensin-converting enzyme (ACE) inhibitors are now the established first-line treatment in younger patients with hypertension and are also extensively used to treat heart failure. They are known to be less effective in treating hypertensive Afro-Caribbean patients. ACE inhibitors are also

used to treat diabetic nephropathy and have a role in secondary prevention of ischaemic heart disease.

Mechanism of action:

- inhibit the conversion angiotensin I to angiotensin II

Side-effects:

- cough: occurs in around 15% of patients and may occur up to a year after starting treatment. Thought to be due to increased bradykinin levels
- angioedema: may occur up to a year after starting treatment
- hyperkalaemia
- first-dose hypotension: more common in patients taking diuretics

Cautions and contraindications

- pregnancy and breastfeeding - avoid
- renovascular disease - significant renal impairment may occur in patients who have undiagnosed bilateral renal artery stenosis
- aortic stenosis - may result in hypotension
- patients receiving high-dose diuretic therapy (more than 80 mg of furosemide a day) - significantly increases the risk of hypotension
- hereditary of idiopathic angioedema

Monitoring

- urea and electrolytes should be checked before treatment is initiated and after increasing the dose
- a rise in the creatinine and potassium may be expected after starting ACE inhibitors. Acceptable changes are an increase in serum creatinine, up to 30%* from baseline and an increase in potassium up to 5.5 mmol/l*.

*Renal Association UK, Clinical Knowledge Summaries quote 50% which seems rather high. SIGN advise that the fall in eGFR should be less than 20%. The NICE CKD guidelines suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable



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Next

A 71-year-old woman presents with palpitations and 'lightheadedness'. An ECG shows that she is in atrial fibrillation with a rate of 130 / min. Her blood pressure is normal and examination of her cardiorespiratory system is otherwise unremarkable. Her past medical history includes well controlled asthma (salbutamol & beclomethasone) and depression (citalopram). Her symptoms have been present for around three days. What is the most appropriate medication to use for rate control?



- | | |
|----------------------------------|---------------|
| <input checked="" type="radio"/> | A. Diltiazem |
| <input type="radio"/> | B. Sotalol |
| <input type="radio"/> | C. Digoxin |
| <input type="radio"/> | D. Atenolol |
| <input type="radio"/> | E. Amiodarone |

Next question

Her history of asthma is a contraindication to the prescription of a beta-blocker. NICE therefore recommend a rate-limiting calcium channel blocker.

Consideration should also be given to antithrombotic therapy.

Atrial fibrillation: rate control and maintenance of sinus rhythm

The Royal College of Physicians and NICE published guidelines on the management of atrial fibrillation (AF) in 2006. The following is also based on the joint American Heart Association (AHA), American College of Cardiology (ACC) and European Society of Cardiology (ESC) 2012 guidelines

Agents used to control rate in patients with atrial fibrillation

- beta-blockers
- calcium channel blockers
- digoxin (not considered first-line anymore as they are less effective at controlling the heart rate during exercise. However, they are the preferred choice if the patient has coexistent heart failure)

Agents used to maintain sinus rhythm in patients with a history of atrial fibrillation

- sotalol
- amiodarone
- flecainide
- others (less commonly used in UK): disopyramide, dofetilide, procainamide, propafenone, quinidine

The table below indicates some of the factors which may be considered when considering either a rate control or rhythm control strategy

Factors favouring rate control	Factors favouring rhythm control
Older than 65 years History of ischaemic heart disease	Younger than 65 years Symptomatic First presentation Lone AF or AF secondary to a corrected precipitant (e.g. Alcohol) Congestive heart failure

Question 37 of 156

Next

A 59-year-old man comes for review. He was diagnosed with hypertension three years ago. He currently is prescribed ramipril 10mg od, amlodipine 10mg od, indapamide 2.5mg od and spironolactone 25mg od. A trial of a doxazosin was stopped due to problems with dizziness. Despite these medications his blood pressure in clinic today is 158/102 mmHg, This is confirmed with a 24 hour blood pressure reading averaging 154/98 mmHg. What is the most appropriate next step in management?

- ☐ A. Increase spironolactone to 50mg od
- ☐ B. Add bisoprolol 1.2mg od
- ☐ C. Add losartan 25mg od



D. Refer to secondary care



E. Add aliskiren 150mg od

Next question

This relatively young patient has a significantly raised blood pressure despite using four antihypertensives. This raises the possibility of a secondary cause - referral to secondary care is therefore appropriate for further investigation.

NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Stage	Criteria
hypertension	

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if $<$ 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients $<$ 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients $<$ 55-years-old: ACE inhibitor (A)
- patients $>$ 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP $\geq 140/90$ mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I

- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

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Next

You are advising a patient who has recently been discharged following a myocardial infarction (MI). From a dietary perspective, we ask you what is the best way he can reduce his chance of having a further MI. Following NICE guidance, what is the most appropriate response?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Omega-3 supplements |
| <input checked="" type="radio"/> | B. Mediterranean diet |
| <input type="radio"/> | C. Folic acid supplements |
| <input type="radio"/> | D. A diet rich in oily fish |
| <input type="radio"/> | E. Vitamin D supplements |

Next question

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor

- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

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Next

You admit a woman who is 34 weeks pregnant to the obstetric ward. She has been monitored for the past few weeks due to pregnancy-induced hypertension but has now developed proteinuria. Her

blood pressure is 162/94 mmHg. Which one of the following antihypertensives is she most likely to be commenced on?

- ☐ A. Moxonidine
- ☐ B. Atenolol
- ☒ C. Labetalol
- ☐ D. Nidedipine
- ☐ E. Methyldopa

Next question

Labetalol is first-line for pregnancy-induced hypertension

Pre-eclampsia

Pre-eclampsia is a condition seen after 20 weeks gestation characterised by pregnancy-induced hypertension in association with proteinuria (> 0.3g / 24 hours). Oedema used to be third element of the classic triad but is now often not included in the definition as it is not specific

Pre-eclampsia is important as it predisposes to the following problems

- fetal: prematurity, intrauterine growth retardation
- eclampsia
- haemorrhage: placental abruption, intra-abdominal, intra-cerebral
- cardiac failure
- multi-organ failure

Risk factors

- > 40 years old
- nulliparity (or new partner)
- multiple pregnancy
- body mass index > 30 kg/m²

- diabetes mellitus
- pregnancy interval of more than 10 years
- family history of pre-eclampsia
- previous history of pre-eclampsia
- pre-existing vascular disease such as hypertension or renal disease

Features of severe pre-eclampsia

- hypertension: typically > 170/110 mmHg and proteinuria as above
- proteinuria: dipstick ++/+++
- headache
- visual disturbance
- papilloedema
- RUQ/epigastric pain
- hyperreflexia
- platelet count < 100 * 10⁶/l, abnormal liver enzymes or HELLP syndrome

Management

- consensus guidelines recommend treating blood pressure > 160/110 mmHg although many clinicians have a lower threshold
- oral labetalol is now first-line following the 2010 NICE guidelines. Nifedipine and hydralazine may also be used
- delivery of the baby is the most important and definitive management step. The timing depends on the individual clinical scenario

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Next

You are asked to review an ECG by one of the Nurse Practitioners at the surgery. An 84-year-old woman has been brought to the surgery by her daughter following a fall. The ECG is shown below:



© Image used on license from [Dr Smith, University of Minnesota](#)



What is shown on the ECG?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Anterior ST elevation myocardial infarction |
| <input type="radio"/> | B. Right bundle branch block |
| <input type="radio"/> | C. Broad complex tachycardia |
| <input type="radio"/> | D. Inferior ST elevation myocardial infarction |
| <input checked="" type="radio"/> | E. Paced rhythm |

Next question

Pacing spikes can be seen before the widened QRS complex, most clearly in V3-V6. The widened QRS complex means that ventricles are paced rather than the atria. Ventricular pacing tends to be on the right side giving the left bundle branch block like waveform seen here.

Pacemaker: permanent

Indications for permanent pacemaker (PPM) insertion include:

- persistent symptomatic bradycardia e.g. sick sinus syndrome
- complete heart block
- Mobitz type II AV block
- persistent AV block after myocardial infarction

Next

A 66-year-old man presents as he is concerned about his blood pressure. He used his wife's home blood pressure monitor and found his blood pressure to be 154/96 mmHg. His blood pressure today in clinic is 156/98 mmHg with a second reading of 154/98 mmHg. He has no past medical history of note. You arrange for him to have his a fasting glucose and lipid profile checked. What is the most appropriate course of action?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Reassure him that today's blood pressure is below a treatment threshold, repeat in 12 months |
| <input checked="" type="radio"/> | B. Arrange ambulatory blood pressure monitoring |
| <input type="radio"/> | C. Start a calcium channel blocker |
| <input type="radio"/> | D. Start an ACE inhibitor |
| <input type="radio"/> | E. Start a thiazide diuretic |

Next question

NICE recommend confirming the diagnosis using ambulatory blood pressure monitoring prior to starting treatment.

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time there blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood

pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patients' overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
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Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered

- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

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Next

A 53-year-old woman is reviewed in the hypertension clinic. Her past medical history includes depression and gout. Two months ago she was started on lisinopril for hypertension. The dose was gradually titrated up and her urea and electrolytes were monitored. Today she complains of a dry cough which has got gradually worse over the past four weeks. She describes it as being 'really annoying' and complains that it keeps her up at night. She is a non-smoker and a chest x-ray performed during an Emergency Department visit six weeks ago was normal. What is the most appropriate action with respect to her anti-hypertensive medications?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Reassure her that the majority of ACE related coughs resolve within three months |
| <input checked="" type="radio"/> | B. Switch her to an angiotensin II receptor blocker |
| <input type="radio"/> | C. Switch her to bendroflumethiazide |
| <input type="radio"/> | D. Switch her to amlodipine |
| <input type="radio"/> | E. Explain that as the cough developed four weeks after starting treatment it is unlikely to be ACE related |

Next question

NICE advise the following: '*Offer people aged under 55 years an ACE inhibitor or a low-cost ARB. If an ACE inhibitor is prescribed and is not tolerated (for example, because of cough), offer a low-cost ARB.*'

Up to 15% of patients who are started on an ACE inhibitor develop a dry cough. Her symptoms are interfering with sleep and have persisted now for four weeks. It is therefore appropriate to switch her to an angiotensin II receptor blocker.

Angiotensin II receptor blockers

Angiotensin II receptor blockers are generally used in situations where patients have not tolerated an ACE inhibitor, usually due to the development of a cough.

Examples

- candesartan
- losartan
- irbesartan

Like ACE inhibitors they should be used with caution in patients with renovascular disease. Side-effects include hypotension and hyperkalaemia.

Mechanism

- block effects of angiotensin II at the AT1 receptor

Evidence base

- shown to reduce progression of renal disease in patients with diabetic nephropathy
- evidence base that losartan reduces CVA and IHD mortality in hypertensive patients

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Next

A cardiologist has asked you to start oral amiodarone for a patient who has previously been admitted with ventricular tachycardia. What tests is it important to ensure the patient has had prior to starting treatment?

- ✓ ☒ A. TFT + LFT + U&E + chest x-ray
- ☐ B. TFT + LFT
- ☐ C. TFT + LFT + chest x-ray
- ☐ D. TFT + LFT + U&E
- ☐ E. TFT + LFT + FBC

Next question

A baseline chest x-ray is required due to the risk of pulmonary fibrosis / pneumonitis in patients treated with amiodarone. Urea and electrolytes are suggested by the BNF to detect hypokalaemia which may increase the risk of arrhythmias developing.

Amiodarone

Amiodarone is a class III antiarrhythmic agent used in the treatment of atrial, nodal and ventricular tachycardias. The main mechanism of action is by blocking potassium channels which inhibits repolarisation and hence prolongs the action potential. Amiodarone also has other actions such as blocking sodium channels (a class I effect)

The use of amiodarone is limited by a number of factors

- long half-life (20-100 days)
- should ideally be given into central veins (causes thrombophlebitis)
- has proarrhythmic effects due to lengthening of the QT interval
- interacts with drugs commonly used concurrently e.g. Decreases metabolism of warfarin
- numerous long-term adverse effects (see below)

Monitoring of patients taking amiodarone

- TFT, LFT, U&E, CXR prior to treatment
- TFT, LFT every 6 months

Adverse effects of amiodarone use

- thyroid dysfunction
- corneal deposits
- pulmonary fibrosis/pneumonitis
- liver fibrosis/hepatitis
- peripheral neuropathy, myopathy
- photosensitivity
- 'slate-grey' appearance
- thrombophlebitis and injection site reactions
- bradycardia

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Next

A 62-year-old female with a history of mitral regurgitation attends her dentist, who intends to perform dental polishing. She is known to be penicillin allergic. What prophylaxis against infective endocarditis should be given?

- ☐ A. Oral doxycycline
- ☐ B. Oral erythromycin
- ☒ C. No antibiotic prophylaxis needed
- ☐ D. Oral ofloxacin
- ☐ E. Oral clindamycin

Next question

The 2008 NICE guidelines have fundamentally changed the approach to infective endocarditis prophylaxis

Infective endocarditis: prophylaxis

The 2008 guidelines from NICE have radically changed the list of procedures for which antibiotic prophylaxis is recommended

NICE recommends the following procedures do not require prophylaxis:

- dental procedures
- upper and lower gastrointestinal tract procedures
- genitourinary tract; this includes urological, gynaecological and obstetric procedures and childbirth
- upper and lower respiratory tract; this includes ear, nose and throat procedures and bronchoscopy

The guidelines do however suggest:

- any episodes of infection in people at risk of infective endocarditis should be investigated and treated promptly to reduce the risk of endocarditis developing

- if a person at risk of infective endocarditis is receiving antimicrobial therapy because they are undergoing a gastrointestinal or genitourinary procedure at a site where there is a suspected infection they should be given an antibiotic that covers organisms that cause infective endocarditis

Question 45 of 156

Next

A 79-year-old woman is reviewed. She has taken bendroflumethiazide 2.5mg od for the past 10 years for hypertension. Her current blood pressure is 150/94 mmHg. Clinical examination is otherwise unremarkable. An echocardiogram from two months ago is reported as follows:

Ejection fraction 48%, moderate left ventricular hypertrophy. Minimal MR noted

What is the most appropriate next step in management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Increase bendroflumethiazide to 5mg od |
| <input type="radio"/> | B. Stop bendroflumethiazide + start frusemide 40mg od |
| <input checked="" type="radio"/> | C. Add ramipril 1.25mg od |
| <input type="radio"/> | D. Stop bendroflumethiazide + start ramipril 1.25mg od |
| <input type="radio"/> | E. Add amlodipine 5mg od |

Next question

The echocardiogram shows a degree of left ventricular impairment. It is important an ACE inhibitor is started in such patients. This will help to both control her blood pressure and also slow the deterioration in her cardiac function. A beta-blocker should also be added due to the evidence of heart failure.

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

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Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55-years-old: ACE inhibitor (A)
- patients > 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 46 of 156

Next

You review a 67-year-old man with a past history of hypertension. He complains of gradually increasing shortness-of-breath on exertion and orthopnoea over the past few months. Clinical examination is unremarkable. Blood tests including full blood count are normal. Spirometry and a chest x-ray are also normal. You suspect the patient may have heart failure. What is the most appropriate next test to perform?

- ☐ A. Troponin I
- ✓ ☒ B. B-type natriuretic peptide
- ☐ C. Myocardial perfusion scan
- ☐ D. Echocardiogram
- ☐ E. Coronary angiography

Next question

It would also be prudent to obtain an ECG.

Heart failure: diagnosis

NICE issued updated guidelines on diagnosis and management in 2010. The choice of investigation is determined by whether the patient has previously had a myocardial infarction or not.

Previous myocardial infarction

- arrange echocardiogram within 2 weeks

No previous myocardial infarction

- measure serum natriuretic peptides (BNP)
- if levels are 'high' arrange echocardiogram within 2 weeks
- if levels are 'raised' arrange echocardiogram within 6 weeks

Serum natriuretic peptides

B-type natriuretic peptide (BNP) is a hormone produced mainly by the left ventricular myocardium in response to strain. Very high levels are associated with a poor prognosis.

	BNP	NTproBNP
High levels	> 400 pg/ml (116 pmol/litre)	> 2000 pg/ml (236 pmol/litre)

Raised levels	100-400 pg/ml (29-116 pmol/litre)	400-2000 pg/ml (47-236 pmol/litre)
Normal levels	< 100 pg/ml (29 pmol/litre)	< 400 pg/ml (47 pmol/litre)

Factors which alter the BNP level:

Increase BNP levels	Decrease BNP levels
Left ventricular hypertrophy Ischaemia Tachycardia Right ventricular overload Hypoxaemia (including pulmonary embolism) GFR < 60 ml/min Sepsis COPD Diabetes Age > 70 Liver cirrhosis	Obesity Diuretics ACE inhibitors Beta-blockers Angiotensin 2 receptor blockers Aldosterone antagonists

Question 47 of 156

Next

A 72-year-old man who has chronic heart failure secondary to ischaemic heart disease presents with knee pain. A recent x-ray has shown osteoarthritis. Which one of the following medications should be avoided if possible?

- ✓ ☒ A. Oral ibuprofen
- ☐ B. Oral paracetamol
- ☐ C. Oral codeine
- ☐ D. Oral tramadol
- ☐ E. Topical diclofenac

Next question

Oral NSAIDs such as ibuprofen should be avoided in heart failure as they may cause fluid retention.

Prescribing in patients with heart failure

The following medications may exacerbate heart failure:

- thiazolidinediones*: pioglitazone is contraindicated as it causes fluid retention
- verapamil: negative inotropic effect
- NSAIDs**/glucocorticoids: should be used with caution as they cause fluid retention
- class I antiarrhythmics; flecainide (negative inotropic and proarrhythmic effect)

*pioglitazone is now the only thiazolidinedione on the market

**low-dose aspirin is an exception - many patients will have coexistent cardiovascular disease and the benefits of taking aspirin easily outweigh the risks

Question 48 of 156

Next

A 70-year-old man who currently takes warfarin asks about the possibility of switching to dabigatran to avoid the need for regular INR testing.

Which one of the following would be a contraindication to the prescription of dabigatran?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Atrial fibrillation secondary to ischaemic heart disease |
| <input checked="" type="radio"/> | B. Mechanical heart valve |
| <input type="radio"/> | C. Epilepsy |
| <input type="radio"/> | D. A history of depression |
| <input type="radio"/> | E. Atrial fibrillation with a ejection fraction of 35% |

Next question

Dabigatran should not be used in patients with mechanical heart valves

Dabigatran is associated with higher bleeding and thrombotic events in patients with recent mechanical heart valves compared to warfarin. The MHRA have therefore said it is contraindicated in such patients.

Dabigatran

Dabigatran is an oral anticoagulant that works by being a direct thrombin inhibitor. It is one of the drugs developed over the past 10-15 years as an alternative to warfarin, with the advantage that it does not require regular monitoring.

What is dabigatran used for?

Dabigatran is currently used for two main indications.

Firstly it is an option in the prophylaxis of venous thromboembolism following hip or knee replacement surgery.

Secondly, it is also licensed in the UK for prevention of stroke in patients with non-valvular atrial fibrillation who have one or more of the following risk factors present:

- previous stroke, transient ischaemic attack or systemic embolism
- left ventricular ejection fraction below 40%
- symptomatic heart failure of New York Heart Association (NYHA) class 2 or above
- age 75 years or older
- age 65 years or older with one of the following: diabetes mellitus, coronary artery disease or hypertension

What are the known side-effects of dabigatran?

Unsurprisingly haemorrhage is the major adverse effect.

Doses should be reduced in chronic kidney disease and dabigatran should not be prescribed if the creatinine clearance is < 30 ml/min.

Drug Safety Update 2013

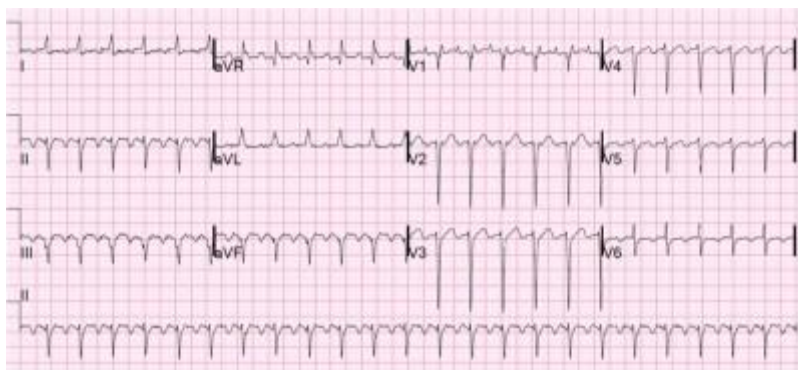
The RE-ALIGN study showed significantly higher bleeding and thrombotic events in patients with recent mechanical heart valve replacement using dabigatran compared with warfarin.

Previously there had been no guidance to support the use of dabigatran in patients with prosthetic heart valves but the advice has now changed to dabigatran being contraindicated in such patients.

Question 49 of 156

Next

A 67-year-old woman presents with palpitations. Her pulse rate is around 150/min. An ECG is immediately ordered:



© Image used on license from [Dr Smith, University of Minnesota](#)



What does the ECG show?

- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Junctional tachycardia |
| <input checked="" type="radio"/> | B. Atrial flutter |
| <input type="radio"/> | C. Atrial fibrillation |
| <input type="radio"/> | D. Broad-complex tachycardia |
| <input type="radio"/> | E. Wolff-Parkinson White syndrome |

Next question

The ECG shows atrial flutter with 2:1 block. It has the characteristic 'sawtooth' appearance.

Atrial flutter

Atrial flutter is a form of supraventricular tachycardia characterised by a succession of rapid atrial depolarisation waves.

ECG findings

- 'sawtooth' appearance
- as the underlying atrial rate is often around 300/min the ventricular or heart rate is dependent on the degree of AV block. For example if there is 2:1 block the ventricular rate will be 150/min
- flutter waves may be visible following carotid sinus massage or adenosine

Management

- is similar to that of atrial fibrillation although medication may be less effective
- atrial flutter is more sensitive to cardioversion however so lower energy levels may be used
- radiofrequency ablation of the tricuspid valve isthmus is curative for most patients

Question 50 of 156

Next

A middle-aged man presents with central chest pain. This has been since present this morning and is described as 'severe' and 'burning'. Examination of the cardiovascular system is unremarkable with a heart rate of 84/min, blood pressure of 148/92 mmHg and oxygen saturations of 98% on room air. You obtain an ECG:



What does the ECG show?

- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Wolff-Parkinson White syndrome |
| <input type="radio"/> | B. Right bundle branch block |
| <input type="radio"/> | C. First degree heart block |
| <input type="radio"/> | D. Inferior myocardial ischaemia |
| <input checked="" type="radio"/> | E. Normal ECG |

Next question

This is a normal ECG. T wave inversion in III is a normal variant.

The May 2011 AKT feedback report stated: '*... candidates should remember that some of the items require them to recognise clinical or laboratory findings as normal.*'

ECG: normal variants

The following ECG changes are considered normal variants in an athlete:

- sinus bradycardia
- junctional rhythm
- first degree heart block
- Wenckebach phenomenon

Question 51 of 156

Next

You are reviewing a patient who has recently 'passed out'. Which one of the following is a cause of orthostatic syncope?

- | | |
|-----------------------|-----------------------------------|
| <input type="radio"/> | A. Carotid sinus hypersensitivity |
|-----------------------|-----------------------------------|

- | | |
|----------------------------------|---------------------------|
| <input type="radio"/> | B. Pulmonary embolism |
| <input type="radio"/> | C. Micturition |
| <input type="radio"/> | D. Sinus node dysfunction |
| <input checked="" type="radio"/> | E. Diabetic neuropathy |

Next question

Syncope

Syncope may be defined as a transient loss of consciousness due to global cerebral hypoperfusion with rapid onset, short duration and spontaneous complete recovery. Note how this definition excludes other causes of collapse such as epilepsy.

The European Society of Cardiology published guidelines in 2009 on the investigation and management of syncope. They suggested the following classification:

Reflex syncope (neurally mediated)

- vasovagal: triggered by emotion, pain or stress. Often referred to as 'fainting'
- situational: cough, micturition, gastrointestinal
- carotid sinus syncope

Orthostatic syncope

- primary autonomic failure: Parkinson's disease, Lewy body dementia
- secondary autonomic failure: e.g. Diabetic neuropathy, amyloidosis, uraemia
- drug-induced: diuretics, alcohol, vasodilators
- volume depletion: haemorrhage, diarrhoea

Cardiac syncope

- arrhythmias: bradycardias (sinus node dysfunction, AV conduction disorders) or tachycardias (supraventricular, ventricular)
- structural: valvular, myocardial infarction, hypertrophic obstructive cardiomyopathy

- others: pulmonary embolism

Reflex syncope is the most common cause in all age groups although orthostatic and cardiac causes become progressively more common in older patients.

Evaluation

- cardiovascular examination
- postural blood pressure readings: a symptomatic fall in systolic BP > 20 mmHg or diastolic BP > 10 mmHg or decrease in systolic BP < 90 mmHg is considered diagnostic
- ECG
- carotid sinus massage
- tilt table test
- 24 hour ECG

Question 52 of 156

Next

A 53-year-old man is reviewed in clinic. Two months ago he was started on ramipril after being diagnosed with stage 2 hypertension following ambulatory blood pressure monitoring. His clinic readings had decreased from 164/96 mmHg to 142/84 mmHg. Unfortunately he has developed a troublesome, dry cough over the past 4 weeks. What is the most appropriate course of action?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Stop ramipril and start amlodipine |
| <input checked="" type="radio"/> | B. Stop ramipril and start losartan |
| <input type="radio"/> | C. Stop ramipril and start indapamide |
| <input type="radio"/> | D. Stop ramipril and start lisinopril |
| <input type="radio"/> | E. Reassure him that the cough is unlikely to be related to ramipril given the time of onset |

Next question

Angiotensin-receptor blockers should be used where ACE inhibitors are not tolerated

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
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Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
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Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg

- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
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New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
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A 62-year-old man is reviewed. His blood pressure is poorly controlled at 152/90 mmHg despite treatment with ramipril 10mg od, bendroflumethiazide 2.5mg od and amlodipine 10mg od. In addition

to the antihypertensives he also takes aspirin and simvastatin. His most recent blood tests show the following:

Na ⁺	139 mmol/l
K ⁺	4.2 mmol/l
Urea	5.5 mmol/l
Creatinine	98 μ mol/l

What is the most appropriate change to his medication?

- ☐ A. Add frusemide
- ☐ B. Increase ramipril to 20mg od
- ☒ C. Add spironolactone
- ☐ D. Add candesartan
- ☐ E. Add atenolol

Next question

Hypertension - step 4

- K⁺ < 4.5 then spironolactone
- K⁺ > 4.5 then higher-dose thiazide-like diuretic

This patient has reached step 4 in the NICE hypertension guidelines. As their potassium is less than 4.5 mmol/l spironolactone 25mg od should be started.

The April 2012 AKT feedback report commented: 'Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.'

Hypertension: management

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Question 54 of 156

Next

You review a 67-year-old man who has recently started a beta-blocker for heart failure. Which one of the following side-effects is most likely to be caused by his new medication?

- ✓ ☒ A. Sleep disturbances
- ☐ B. Exacerbation of glaucoma

- | | |
|-----------------------|---------------------------|
| <input type="radio"/> | C. Urinary retention |
| <input type="radio"/> | D. Exacerbation of eczema |
| <input type="radio"/> | E. Palpitations |

[Next question](#)

Beta-blockers

Beta-blockers are an important class of drug used mainly in the management of cardiovascular disorders.

Indications

- angina
- post-myocardial infarction
- heart failure: beta-blockers were previously avoided in heart failure but there is now strong evidence that certain beta-blockers improve both symptoms and mortality
- arrhythmias: beta-blockers have now replaced digoxin as the rate-control drug of choice in atrial fibrillation
- hypertension: the role of beta-blockers has diminished in recent years due to a lack of evidence in terms of reducing stroke and myocardial infarction.
- thyrotoxicosis
- migraine prophylaxis
- anxiety

Examples

- atenolol
- propranolol: one of the first beta-blockers to be developed. Lipid soluble therefore crosses the blood-brain barrier

Side-effects

- bronchospasm
- cold peripheries

- fatigue
- sleep disturbances, including nightmares

Contraindications

- uncontrolled heart failure
- asthma
- sick sinus syndrome
- concurrent verapamil use: may precipitate severe bradycardia

Question 55 of 156

Next

Which one of the following statements regarding the increased risk of venous thromboembolism (VTE) following air travel is correct?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. All patients ≥ 65 -years-old should be advised to wear compression stockings for flights ≥ 5 hours |
| <input type="radio"/> | B. There is no association between the distance flown and the risk of VTE |
| <input type="radio"/> | C. Patients at a moderate or high risk of VTE should be advised to take aspirin 75mg od, starting two days before the flight |
| <input type="radio"/> | D. The most effective measure to prevent VTE is to ensure good hydration |
| <input checked="" type="radio"/> | E. Compression stockings have a role in reducing the risk of VTE in moderate or high risk patients |

Next question

Compression stockings are the most appropriate prophylactic measure for moderate or high risk patients. Very high risk patients may require low molecular weight heparin as well.

None of the current UK guidelines recommend a role for aspirin.

As SIGN point in there guideline there is no actual evidence that ensuring good hydration prevents VTE. Whilst ensuring adequate hydration is clearly common sense is is not the most effective measure for preventing VTE.

Travel-related thrombosis

It is not uncommon for us to be asked by patients whether they should take aspirin prior to a long haul flight. So called 'economy class syndrome' as a concept has increased in the public's mind over the past 10 years or so. It is certainly true that long-haul air travel is associated with an increased risk of VTE. A 2001 study in the New England Journal of Medicine¹ showed the following risk of pulmonary embolism:

- 0.01 cases per million for travel under 5,000 km
- 1.5 cases per million for travel between 5,000 - 10,000 km
- 4.8 cases per million for travel over 10,000 km

The Civil Aviation Authority do not give specific guidance relating to venous thromboembolism. The British Committee for Standards in Haematology did however produce guidelines in 2005 as did SIGN in 2010 and Clinical Knowledge Summaries (CKS) in 2013. Unfortunately, there is no universal agreement on what to advise patients.

The most recent CKS guidelines advise that we take a risk based approach. For example, a patient with no major risk factors for VTE (i.e. the average person) then no special measures are needed.


Patients with major risk factors should consider wearing anti-embolism stockings. These can either be bought by the patient or prescribed (class I). Clearly if the risk is very high (e.g. a long-haul flight following recent major surgery) then consideration should be given to delaying the flight or specialist advice sought regarding the use of low-molecular weight heparin.

All guidelines agree there is no role for aspirin in low, medium or high risk patients.

Question 56 of 156

Next

You are about to start a patient on lisinopril for hypertension. Which one of the following conditions is most likely to increase the risk of side-effects?

-  ☒ A. Aortic stenosis
- ☐ B. Previous subarachnoid haemorrhage

<input type="radio"/>	C. A history of lung cancer
<input type="radio"/>	D. Concurrent prescription of bendroflumethiazide
<input type="radio"/>	E. Chronic kidney disease stage 2

Next question

Patients with aortic stenosis are at risk of profound hypotension with ACE inhibitors.

Bendroflumethiazide is a weak diuretic that is commonly co-prescribed with ACE inhibitors. The risk of hypotension relates to high-dose loop diuretics, for example furosemide 80mg bd.

Patients with chronic kidney disease stage 2 have, by definition, a glomerular filtration rate of > 60 mL/min/1.73 m². It is unlikely that this will have a significant effect on the risk of side-effects.

Angiotensin-converting enzyme inhibitors

Angiotensin-converting enzyme (ACE) inhibitors are now the established first-line treatment in younger patients with hypertension and are also extensively used to treat heart failure. They are known to be less effective in treating hypertensive Afro-Caribbean patients. ACE inhibitors are also used to treat diabetic nephropathy and have a role in secondary prevention of ischaemic heart disease.

Mechanism of action:

- inhibit the conversion angiotensin I to angiotensin II

Side-effects:

- cough: occurs in around 15% of patients and may occur up to a year after starting treatment. Thought to be due to increased bradykinin levels
- angioedema: may occur up to a year after starting treatment
- hyperkalaemia
- first-dose hypotension: more common in patients taking diuretics

Cautions and contraindications

- pregnancy and breastfeeding - avoid

- renovascular disease - significant renal impairment may occur in patients who have undiagnosed bilateral renal artery stenosis
- aortic stenosis - may result in hypotension
- patients receiving high-dose diuretic therapy (more than 80 mg of furosemide a day) - significantly increases the risk of hypotension
- hereditary of idiopathic angioedema

Monitoring

- urea and electrolytes should be checked before treatment is initiated and after increasing the dose
- a rise in the creatinine and potassium may be expected after starting ACE inhibitors. Acceptable changes are an increase in serum creatinine, up to 30%* from baseline and an increase in potassium up to 5.5 mmol/l*.

*Renal Association UK, Clinical Knowledge Summaries quote 50% which seems rather high. SIGN advise that the fall in eGFR should be less than 20%. The NICE CKD guidelines suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable

Question 57 of 156

Next

You review a 75-year-old man who complains of palpitations. He was diagnosed with atrial fibrillation around four months ago and started on digoxin 125 mcg od and warfarin. Despite this treatment he still feels his 'heart race' regularly. On examination his pulse is 96 / min irregularly irregular and respiratory examination is unremarkable. What is the most appropriate next step in management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Switch digoxin for verapamil |
| <input type="radio"/> | B. Refer for electrical cardioversion |
| <input type="radio"/> | C. Add amiodarone |
| <input checked="" type="radio"/> | D. Add bisoprolol |
| <input type="radio"/> | E. Make no change to his regular medication but prescribe flecainide as a 'pill in the pocket' |

Adding a beta-blocker would be the best option here. It will help control the heart rate and may have cardioprotective properties in certain patients (e.g. Those with heart failure, ischaemic heart disease or hypertension).

Atrial fibrillation: rate control and maintenance of sinus rhythm

The Royal College of Physicians and NICE published guidelines on the management of atrial fibrillation (AF) in 2006. The following is also based on the joint American Heart Association (AHA), American College of Cardiology (ACC) and European Society of Cardiology (ESC) 2012 guidelines

Agents used to control rate in patients with atrial fibrillation

- beta-blockers
- calcium channel blockers
- digoxin (not considered first-line anymore as they are less effective at controlling the heart rate during exercise. However, they are the preferred choice if the patient has coexistent heart failure)

Agents used to maintain sinus rhythm in patients with a history of atrial fibrillation

- sotalol
- amiodarone
- flecainide
- others (less commonly used in UK): disopyramide, dofetilide, procainamide, propafenone, quinidine

The table below indicates some of the factors which may be considered when considering either a rate control or rhythm control strategy

Factors favouring rate control	Factors favouring rhythm control
Older than 65 years History of ischaemic heart disease	Younger than 65 years Symptomatic First presentation Lone AF or AF secondary to a corrected precipitant (e.g. Alcohol) Congestive heart failure

Question 58 of 156

Next

Which one of the following treatments have not been shown to improve mortality in patients with chronic heart failure?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Beta-blockers |
| <input type="radio"/> | B. Spironolactone |
| <input checked="" type="radio"/> | C. Frusemide |
| <input type="radio"/> | D. Nitrates and hydralazine |
| <input type="radio"/> | E. Enalapril |

Next question

Whilst useful in managing the symptoms of acute and chronic heart failure frusemide offers no prognostic benefits.

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- ACE inhibitors (SAVE, SOLVD, CONSENSUS)
- spironolactone (RALES)
- beta-blockers (CIBIS)
- hydralazine with nitrates (VHEFT-1)

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered

- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine

*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 59 of 156

Next

A 71-year-old woman comes for review. She was diagnosed with angina pectoris recently and is currently taking aspirin 75mg od, simvastatin 40mg on and atenolol 100mg od. If her anginal symptoms are not controlled on this medication, what is the most appropriate next step?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Add an ACE inhibitor |
| <input type="radio"/> | B. Add nicorandil |
| <input type="radio"/> | C. Add isosorbide mononitrate MR |
| <input type="radio"/> | D. Refer for revascularisation |
| <input checked="" type="radio"/> | E. Add a long-acting dihydropyridine calcium-channel blocker |

Next question

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'
- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

Question 60 of 156

Next

A 59-year-old man with ischaemic heart disease experiences chest pain whilst walking up a hill. He uses his sublingual glyceryl trinitrate (GTN) spray. Which one of the following side-effect profiles best describes the likely consequences of taking the GTN spray?

- ☐ A. Hypotension + tachycardia + dyspnoea
- ☐ B. Hypotension + bradycardia + 'clouding' of vision
- ☐ C. Hypertension + bradycardia + headache
- ☐ D. Hypotension + dyspnoea + headache
- ☒ E. Hypotension + tachycardia + headache

Next question

Nitrates

Nitrates are a group of drugs which have vasodilating effects. The main indications for their use is in the management of angina and the acute treatment of heart failure. Sublingual glyceryl trinitrate is the most common drug used in patients with ischaemic heart disease to relieve angina attacks.

Mechanism of action

- cause release of nitric oxide in smooth muscle, increasing cGMP which leads to a fall in intracellular calcium levels
- in angina they both dilate the coronary arteries and also reduce venous return which in turn reduces left ventricular work, reducing myocardial oxygen demand

Side-effects

- hypotension

- tachycardia
- headaches
- flushing

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Question 61 of 156

Next

A 36-year-old man presents to the surgery with chest pain. This started around 2 hours ago and is described as severe. The pain is central, with no radiation. It is not worse on deep inspiration.

He smokes 10 cigarettes/day but is otherwise fit and well. His father had a myocardial infarction at the age of 61 years. Examination of the cardiovascular system is unremarkable with a blood pressure of 136/84 mmHg, pulse 96/min, respiratory rate 14/min and saturations 98% on room air.

An ECG is taken:



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What is the most likely diagnosis?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Pulmonary embolism |
| <input type="radio"/> | B. Anterior myocardial infarction |
| <input checked="" type="radio"/> | C. Acute pericarditis |
| <input type="radio"/> | D. Hypertrophic obstructive cardiomyopathy |
| <input type="radio"/> | E. Brugada syndrome |

Next question

The ECG shows widespread ST elevation but the most diagnosis feature of the ECG is the depression - this is very specific for pericarditis and makes the diagnosis clear.

Pericarditis

Pericarditis is one of the differentials of any patient presenting with chest pain.

Features

- chest pain: may be pleuritic. Is often relieved by sitting forwards
- other symptoms include non-productive cough, dyspnoea and flu-like symptoms
- pericardial rub
- tachypnoea
- tachycardia

Causes

- viral infections (Coxsackie)
- tuberculosis
- uraemia (causes 'fibrinous' pericarditis)
- trauma
- post-myocardial infarction, Dressler's syndrome
- connective tissue disease
- hypothyroidism

ECG changes

- widespread 'saddle-shaped' ST elevation
- PR depression: most specific ECG marker for pericarditis



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ECG showing pericarditis. Note the widespread nature of the ST elevation and the PR depression

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Next

You review a 64-year-old man who has recently been discharged following a ST-elevation myocardial infarction (MI) for which he was treated with a percutaneous coronary intervention. How soon following his MI may he start having intercourse again?

- ☐ A. Straightaway
- ☐ B. 7 days
- ☐ C. 2 weeks
- ☒ D. 4 weeks
- ☐ E. 3 months

Next question

Following a myocardial infarction sexual activity may resume after 4 weeks

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

Question 63-65 of 156

Next

Theme: Heart failure: drug management

- A. Pneumococcal vaccine
- B. Influenza vaccine
- C. Calcium channel blocker
- D. Spironolactone
- E. ACE inhibitor + beta-blocker
- F. Hydralazine + nitrates
- G. ACE inhibitor + frusemide
- H. Digoxin
- I. Echocardiogram
- J. Electrocardiogram

For each one of the following select the most appropriate answer:

63. Should be offered annually for all patients with heart failure

The correct answer is Influenza vaccine

64. Should be introduced first-line in patients with stable impaired left ventricular function

 ACE inhibitor + beta-blocker

65. Has only been demonstrated to improve mortality in patients with NYHA class III or IV heart failure who are already taking an ACE inhibitor

The correct answer is Spironolactone

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- ACE inhibitors (SAVE, SOLVD, CONSENSUS)
- spironolactone (RALES)
- beta-blockers (CIBIS)
- hydralazine with nitrates (VHEFT-1)

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered
- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine

*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 66 of 156

Next

A 67-year-old woman is reviewed in the afternoon clinic. She describes a 20 minute episode heavy central chest pain shortly after getting up from bed this morning, about 7 hours ago. This has not happened before and she has been pain free since the morning. Clinical examination is normal but the ECG shows T wave inversion in the inferior leads. What is the most appropriate action?

- ☐ A. Refer for an exercise tolerance test
- ☐ B. Give aspirin + arrange for same-day hospital assessment
- ☐ C. Calculate her estimated risk of having coronary artery disease
- ☐ D. Start aspirin + check troponin I level
- ☒ E. Give aspirin + arrange an emergency admission (immediate ambulance)

Next question

Chest pain: assessment of patients with suspected cardiac chest pain

NICE issued guidelines in 2010 on the 'Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin'.

Below is a brief summary of the key points. Please see the link for more details.

Patients presenting with acute chest pain

Immediate management of suspected acute coronary syndrome (ACS)

- glyceryl trinitrate
- aspirin 300mg. NICE do not recommend giving other antiplatelet agents (i.e. Clopidogrel) outside of hospital
- do not routinely give oxygen, only give if sats < 94%*
- perform an ECG as soon as possible but do not delay transfer to hospital. A normal ECG does not exclude ACS

Referral

- current chest pain or chest pain in the last 12 hours with an abnormal ECG: emergency admission
- chest pain 12-72 hours ago: refer to hospital the same-day for assessment
- chest pain > 72 hours ago: perform full assessment with ECG and troponin measurement before deciding upon further action

*NICE suggest the following in terms of oxygen therapy:

- do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:
- people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94-98%
- people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88-92% until blood gas analysis is available.

Patients presenting with stable chest pain

With all due respect to NICE the guidelines for assessment of patients with stable chest pain are rather complicated. They suggest an approach where the risk of a patient having coronary artery disease (CAD) is calculated based on their symptoms (whether they have typical angina, atypical angina or non-anginal chest pain), age, gender and risk factors.

NICE define anginal pain as the following:

- 1. constricting discomfort in the front of the chest, neck, shoulders, jaw or arms
- 2. precipitated by physical exertion
- 3. relieved by rest or GTN in about 5 minutes
- patients with all 3 features have typical angina
- patients with 2 of the above features have atypical angina
- patients with 1 or none of the above features have non-anginal chest pain

The risk tables are not reproduced here but can be found by clicking on the link.

If patients have typical anginal symptoms and a risk of CAD is greater than 90% then no further diagnostic testing is required. It should be noted that all men over the age of 70 years who have typical anginal symptoms fall into this category.

For patients with an estimated risk of 10-90% the following investigations are recommended. Note the absence of the exercise tolerance test:

Estimated likelihood of CAD	Diagnostic testing
61-90%	Coronary angiography
30-60%	Functional imaging, for example: <ul style="list-style-type: none">• myocardial perfusion scan with SPECT• stress echocardiography• first-pass contrast-enhanced magnetic resonance (MR) perfusion• MR imaging for stress-induced wall motion abnormalities.
10-29%	CT calcium scoring

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Next

Which one of the following statements regarding calcium channel blockers is correct?

- ☐ A. Diltiazem is the most negatively inotropic calcium channel blocker
- ☐ B. Amlodipine should not be prescribed to patients who are already taking a beta-blocker
- ☐ C. Verapamil should not be used in the management of hypertension
- ☐ D. Nifedipine can be used for rate-control in atrial fibrillation
- ☒ E. Short-acting formulations of nifedipine should not be used for angina or hypertension

Next question

The BNF warns that short-acting formulations of nifedipine are associated with large variations in blood pressure and may cause reflex tachycardia

Calcium channel blockers

Calcium channel blockers are primarily used in the management of cardiovascular disease. Voltage-gated calcium channels are present in myocardial cells, cells of the conduction system and those of the vascular smooth muscle. The various types of calcium channel blockers have varying effects on these three areas and it is therefore important to differentiate their uses and actions.

Examples	Indications & notes	Side-effects and cautions
Verapamil	Angina, hypertension, arrhythmias Highly negatively inotropic Should not be given with beta-blockers as may cause heart block	Heart failure, constipation, hypotension, bradycardia, flushing
Diltiazem	Angina, hypertension Less negatively inotropic than verapamil but caution should still be exercised when patients have heart failure or are taking beta-blockers	Hypotension, bradycardia, heart failure, ankle swelling
Nifedipine, amlodipine, felodipine (dihydropyridines)	Hypertension, angina, Raynaud's Affects the peripheral vascular smooth muscle more than the myocardium and therefore do not result in worsening of heart failure	Flushing, headache, ankle swelling

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Next

A 71-year-old man who had a bioprosthetic aortic valve replacement three years ago is reviewed. What antithrombotic therapy is he likely to be taking?

- ☐ A. Nothing
- ☒ B. Aspirin
- ☐ C. Warfarin: INR 2.0-3.0

- ☐ D. Aspirin + clopidogrel
- ☐ E. Warfarin: INR 3.0-4.0

Next question

Prosthetic heart valves - antithrombotic therapy:

- bioprosthetic: aspirin
- mechanical: warfarin + aspirin

Prosthetic heart valves

The most common valves which need replacing are the aortic and mitral valve. There are two main options for replacement: biological (bioprosthetic) or mechanical.

Biological (bioprosthetic) valves	Mechanical valves
<p>Usually bovine or porcine in origin</p> <p>Major disadvantage is structural deterioration and calcification over time. Most older patients (> 65 years for aortic valves and > 70 years for mitral valves) receive a bioprosthetic valve</p> <p>Long-term anticoagulation not usually needed. Warfarin may be given for the first 3 months depending on patient factors. Low-dose aspirin is given long-term.</p>	<p>The most common type now implanted is the bileaflet valve. Ball-and-cage valves are rarely used nowadays</p> <p>Mechanical valves have a low failure rate</p> <p>Major disadvantage is the increased risk of thrombosis meaning long-term anticoagulation is needed. Aspirin is normally given in addition unless there is a contraindication.</p> <p>Target INR</p> <ul style="list-style-type: none"> • aortic: 2.0-3.0 • mitral: 2.5-3.5

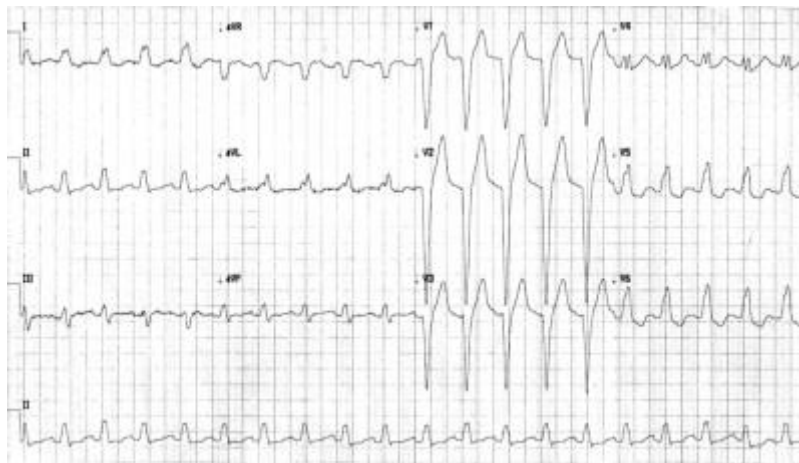
Following the 2008 NICE guidelines for prophylaxis of endocarditis antibiotics are no longer recommended for common procedures such as dental work.

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Next

A 72-year-old woman presents with palpitations. Her past medical history includes ischaemic heart disease and chronic obstructive pulmonary disease. Her pulse is 120/min, blood pressure 110/76 mmHg and the chest is clear on auscultation.

The ECG is shown below:



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What is shown on the ECG?

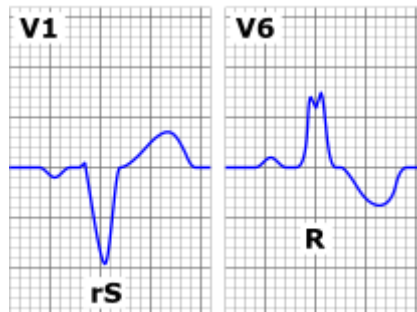
- ☒ **A.** Left bundle branch block
- ☐ **B.** Anterior ST elevation myocardial infarction
- ☐ **C.** Right bundle branch block
- ☐ **D.** Narrow complex tachycardia
- ☐ **E.** Atrial flutter

Next question

The morphology of the QRS complexes is diagnostic for left bundle branch block (LBBB). This finding can be associated with a wide variety of underlying problems but in an acutely unwell patient myocardial ischaemia needs to be excluded.

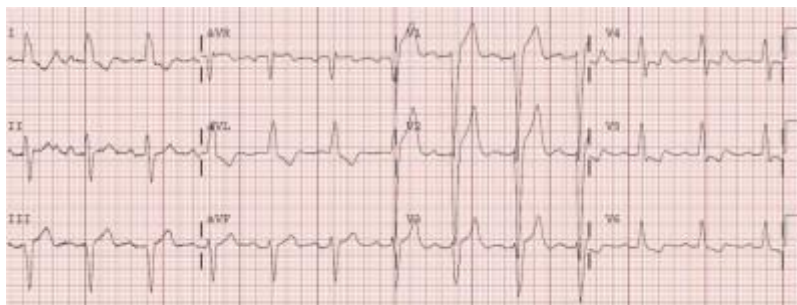
ECG: left bundle branch block

The diagram below shows the typical features of left bundle branch block (LBBB):



One of the most common ways to remember the difference between LBBB and RBBB is WiLLiaM MaRRoW

- in LBBB there is a 'W' in V1 and a 'M' in V6
- in RBBB there is a 'M' in V1 and a 'W' in V6



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ECG showing typical features of LBBB

Causes of LBBB

- ischaemic heart disease
- hypertension
- aortic stenosis

- cardiomyopathy
- rare: idiopathic fibrosis, digoxin toxicity, hyperkalaemia

Question 70 of 156

Next

A patient with known heart failure is unable to carry out any physical activity without discomfort. Symptoms of heart failure are present even at rest with increased discomfort with any physical activity. What New York Heart Association class best describes the severity of their disease?

<input type="radio"/>	A. NYHA Class 0
<input type="radio"/>	B. NYHA Class I
<input type="radio"/>	C. NYHA Class II
<input type="radio"/>	D. NYHA Class III
<input checked="" type="radio"/>	E. NYHA Class IV

Next question

Heart failure: NYHA classification

The New York Heart Association (NYHA) classification is widely used to classify the severity of heart failure:

NYHA Class I

- no symptoms
- no limitation: ordinary physical exercise does not cause undue fatigue, dyspnoea or palpitations

NYHA Class II

- mild symptoms
- slight limitation of physical activity: comfortable at rest but ordinary activity results in fatigue, palpitations or dyspnoea

NYHA Class III

- moderate symptoms
- marked limitation of physical activity: comfortable at rest but less than ordinary activity results in symptoms

NYHA Class IV

- severe symptoms
- unable to carry out any physical activity without discomfort: symptoms of heart failure are present even at rest with increased discomfort with any physical activity

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Next

The use of beta-blockers in treating hypertension has declined sharply in the past five years. Which one of the following best describes the reasons why this has occurred?

- ✓ ☒ A. Less likely to prevent stroke + potential impairment of glucose tolerance
- ☐ B. Less likely to prevent myocardial infarctions + potential impairment of glucose tolerance
- ☐ C. High rate of interactions with other commonly prescribed medications (e.g. Calcium channel blockers)
- ☐ D. Increased incidence of reported adverse effects
- ☐ E. Increased incidence of chronic obstructive pulmonary disease

Next question

This was demonstrated in the Anglo-Scandinavian Cardiac Outcomes Trial-Blood Pressure Lowering Arm (ASCOT-BPLA).

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg

- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 72 of 156

Next

A 57-year-old man presents to surgery with palpitations for the past 24 hours. He has no past history of note. There is no associated chest pain or shortness of breath. Clinical examination is unremarkable other than an irregular tachycardia. An ECG shows atrial fibrillation at a rate of 126 bpm with no other changes. What is the most appropriate management?

- | | |
|----------------------------------|----------------------------|
| <input type="radio"/> | A. Beta-blocker + aspirin |
| <input type="radio"/> | B. Beta-blocker + warfarin |
| <input type="radio"/> | C. Digoxin + warfarin |
| <input type="radio"/> | D. Digoxin + aspirin |
| <input checked="" type="radio"/> | E. Admit patient |

Next question

This patient is suitable for electrical cardioversion and hence should be admitted to hospital.

Atrial fibrillation: cardioversion**Onset < 48 hours**

If the atrial fibrillation (AF) is definitely of less than 48 hours onset patients should be heparinised. Patients who have risk factors for ischaemic stroke should be put on lifelong oral anticoagulation. Otherwise, patients may be cardioverted using either:

- electrical - 'DC cardioversion'
- pharmacology - amiodarone if structural heart disease, flecainide in those without structural heart disease

Following electrical cardioversion if AF is confirmed as being less than 48 hours duration then further anticoagulation is unnecessary

Onset > 48 hours

If the patient has been in AF for more than 48 hours then anticoagulation should be given for at least 3 weeks prior to cardioversion. An alternative strategy is to perform a transoesophageal echo (TOE)

to exclude a left atrial appendage (LAA) thrombus. If excluded patients may be heparinised and cardioverted immediately.

If there is a high risk of cardioversion failure (e.g. Previous failure or AF recurrence) then it is recommend to have at least 4 weeks amiodarone or sotalol prior to electrical cardioversion

Following electrical cardioversion patients should be anticoagulated for at least 4 weeks. After this time decisions about anticoagulation should be taken on an individual basis depending on the risk of recurrence

Question 73 of 156

Next

A middle-aged patient with type 2 diabetes mellitus comes for review. He also has chronic heart failure secondary to dilated cardiomyopathy (NYHA class II). His diabetes is currently diet-controlled but his HbA1c has risen to 64 mmol/mol (8.0%). Which one of the following medications is contraindicated?

- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. Metformin |
| <input checked="" type="radio"/> | B. Pioglitazone |
| <input type="radio"/> | C. Glipizide |
| <input type="radio"/> | D. Exenatide |
| <input type="radio"/> | E. Acarbose |

Next question

Prescribing in patients with heart failure

The following medications may exacerbate heart failure:

- thiazolidinediones*: pioglitazone is contraindicated as it causes fluid retention
- verapamil: negative inotropic effect
- NSAIDs**/glucocorticoids: should be used with caution as they cause fluid retention
- class I antiarrhythmics; flecainide (negative inotropic and proarrhythmic effect)

*pioglitazone is now the only thiazolidinedione on the market

**low-dose aspirin is an exception - many patients will have coexistent cardiovascular disease and the benefits of taking aspirin easily outweigh the risks

Question 74 of 156

Next

One of your elderly patients is admitted to hospital with digoxin toxicity. Which one of her other medications is most likely to have precipitated this?

- ☐ A. Amiloride
- ☐ B. Aspirin
- ☒ C. Diltiazem
- ☐ D. Atorvastatin
- ☐ E. Bisoprolol

Next question

Digoxin and digoxin toxicity

Digoxin is a cardiac glycoside now mainly used for rate control in the management of atrial fibrillation. As it has positive inotropic properties it is sometimes used for improving symptoms (but not mortality) in patients with heart failure.

Mechanism of action

- decreases conduction through the atrioventricular node which slows the ventricular rate in atrial fibrillation and flutter
- increases the force of cardiac muscle contraction due to inhibition of the Na^+/K^+ ATPase pump. Also stimulates vagus nerve

Digoxin toxicity

Plasma concentration alone does not determine whether a patient has developed digoxin toxicity. The BNF advises that the likelihood of toxicity increases progressively from 1.5 to 3 mcg/l.

Features

- generally unwell, lethargy, nausea & vomiting, anorexia, confusion, yellow-green vision
- arrhythmias (e.g. AV block, bradycardia)

Precipitating factors

- classically: hypokalaemia*
- increasing age
- renal failure
- myocardial ischaemia
- hypomagnesaemia, hypercalcaemia, hypernatraemia, acidosis
- hypoalbuminaemia
- hypothermia
- hypothyroidism
- drugs: amiodarone, quinidine, verapamil, diltiazem, spironolactone (competes for secretion in distal convoluted tubule therefore reduce excretion), ciclosporin. Also drugs which cause hypokalaemia e.g. thiazides and loop diuretics

Management

- Digibind
- correct arrhythmias
- monitor potassium

*hyperkalaemia may also worsen digoxin toxicity, although this is very small print

]

Question 75 of 156

Next

A 62-year-old man comes for review. In the past month he has had two episodes of 'passing out'. The first occurred whilst going upstairs. The second occurred last week whilst he was getting out of a swimming pool. There were no warning signs prior to these episodes. He was told by people who witnessed the episode last week that he was only 'out' for around 15 seconds. He reports feeling 'groggy' for only a few seconds after the episode. On examination pulse is 90 / minute, blood pressure 110/86 mmHg, his lungs are clear and there is a systolic murmur which radiates to the carotid area. Which one of the following investigations should be arranged first?

- | | |
|----------------------------------|------------------------|
| <input type="radio"/> | A. 24 hour ECG monitor |
| <input checked="" type="radio"/> | B. Echocardiogram |
| <input type="radio"/> | C. Tilt table test |
| <input type="radio"/> | D. CT head |
| <input type="radio"/> | E. Carotid doppler |

Next question

The systolic murmur may be a pointer to aortic stenosis (AS). Syncope is a late sign and typically occurs on exertion in patients with AS. It is therefore important to exclude this condition as a priority.

Aortic stenosis

Features of severe aortic stenosis

- narrow pulse pressure
- slow rising pulse
- delayed ESM
- soft/absent S2
- S4
- thrill
- duration of murmur
- left ventricular hypertrophy or failure

Causes of aortic stenosis

- degenerative calcification (most common cause in older patients > 65 years)
- bicuspid aortic valve (most common cause in younger patients < 65 years)
- William's syndrome (supravalvular aortic stenosis)
- post-rheumatic disease
- subvalvular: HOCM

Management

- if asymptomatic then observe the patient is general rule
- if symptomatic then valve replacement
- if asymptomatic but valvular gradient > 50 mmHg and with features such as left ventricular systolic dysfunction then consider surgery
- balloon valvuloplasty is limited to patients with critical aortic stenosis who are not fit for valve replacement

Question 76 of 156

Next

A 74-year-old man presents to his GP for a medication review. Blood pressure is recorded as 184/72. This is confirmed on two further occasions. What is the most appropriate first line therapy?

<input type="radio"/>	A. Ramipril
<input type="radio"/>	B. Losartan
<input type="radio"/>	C. Bendroflumethiazide
<input checked="" type="radio"/>	D. Amlodipine
<input type="radio"/>	E. Atenolol

Next question

The 2011 NICE guidelines recommended treating isolated systolic hypertension the same way as standard hypertension. In this age group calcium channel blockers would be first-line.

Isolated systolic hypertension

Isolated systolic hypertension (ISH) is common in the elderly, affecting around 50% of people older than 70 years old. The Systolic Hypertension in the Elderly Program (SHEP) back in 1991 established that treating ISH reduced both strokes and ischaemic heart disease. Drugs such as thiazides were recommended as first line agents. This approach is contradicted by the 2011 NICE guidelines which recommends treating ISH in the same stepwise fashion as standard hypertension.

Question 77 of 156

Next

A 45-year-old man asks you to check his blood pressure as his friend has recently suffered a heart attack. You measure his blood pressure as 142/82 mmHg. Five minutes later his blood pressure is recorded in the same arm as 134/74 mmHg. Following NICE guidance, what is the most appropriate next course of action?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Start antihypertensive treatment with an ACE inhibitor |
| <input type="radio"/> | B. Arrange ambulatory blood pressure monitoring |
| <input checked="" type="radio"/> | C. Reassure him that the second reading is normal and suggest he has it checked in 12 months |
| <input type="radio"/> | D. Start antihypertensive treatment with a calcium channel blocker |
| <input type="radio"/> | E. Refer to secondary care for investigation of possible secondary hypertension |

Next question

Offer ABPM/HBPM if the clinic reading is $\geq 140/90$ mmHg

NICE recommend we make decisions based on the lower reading in the consultation. As this reading is $< 140/90$ mmHg no immediate action is required.

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages

- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remembered that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM $\geq 135/85$ mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 78 of 156

Next

A 72-year-old presents to the surgery complaining of dizziness. An ECG is taken and shows the following:



What is the diagnosis?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Ventricular tachycardia |
| <input type="radio"/> | B. Second degree heart block - Mobitz type 2 |
| <input type="radio"/> | C. First degree heart block |
| <input type="radio"/> | D. Second degree heart block - Mobitz type 1 |
| <input checked="" type="radio"/> | E. Third degree heart block |

Next question

Note how the P waves are not related to the QRS complexes in the ECG - this is the hallmark of third degree (complete) heart block. The QRS complexes represent a ventricular escape rhythm which characteristically has a rate of 35 - 40 bpm.

Complete heart block

Features

- syncope
- heart failure
- regular bradycardia (30-50 bpm)
- wide pulse pressure
- JVP: cannon waves in neck
- variable intensity of S1

Types of heart block

First degree heart block

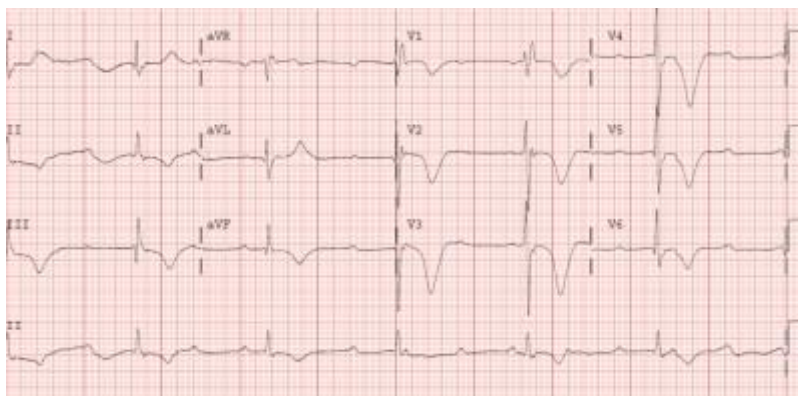
- PR interval > 0.2 seconds

Second degree heart block

- type 1 (Mobitz I, Wenckebach): progressive prolongation of the PR interval until a dropped beat occurs
- type 2 (Mobitz II): PR interval is constant but the P wave is often not followed by a QRS complex

Third degree (complete) heart block

- there is no association between the P waves and QRS complexes



ECG showing third degree (complete) heart block

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Next

A 56-year-old man who has recently been diagnosed with hypertension asks for your advice on salt intake. Based on the most recent evidence available, what is the most appropriate response?

- ☐ A. Salt intake has now been shown not to have a significant effect on blood pressure
- ☐ B. Reducing salt intake is only important if taking thiazide diuretics
- ☒ C. Lowering salt intake significantly reduces blood pressure, the target should be less than 6g per day
- ☐ D. Lowering salt intake significantly reduces blood pressure, the target should be less than 9g per day
- ☐ E. Lowering salt intake significantly reduces blood pressure, the target should be less than 12g per day

Next question

Recent studies have emphasised the rapid and significant reduction in blood pressure that can be achieved when salt intake is reduced.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if $<$ 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55-years-old: ACE inhibitor (A)
- patients > 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

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Next

A 51-year-old female presents to her GP following an episode of transient right sided weakness lasting 10-15 minutes. Examination reveals the patient to be in atrial fibrillation. If the patient remains in chronic atrial fibrillation what is the most suitable form of anticoagulation?

- ☐ A. Aspirin
-  ☒ B. Warfarin, target INR 2-3
- ☐ C. No anticoagulation
- ☐ D. Warfarin, target INR 3-4
- ☐ E. Warfarin, target INR 2-3 for six months then aspirin

Next question

The CHA₂DS₂-VASc for this patient is 3 - 2 for the transient ischaemic attack and 1 for being female. She should therefore be offered anticoagulation with warfarin.

Atrial fibrillation: anticoagulation

The European Society of Cardiology published updated guidelines on the management of atrial fibrillation in 2012. They suggest using the **CHA₂DS₂-VASc** score to determine the most appropriate anticoagulation strategy. This scoring system superseded the CHADS₂ score.

	Risk factor	Points
C	Congestive heart failure	1
H	Hypertension (or treated hypertension)	1
A₂	Age ≥ 75 years	2
	Age 65-74 years	1
D	Diabetes	1
S₂	Prior Stroke or TIA	2
V	Vascular disease (including ischaemic heart disease and peripheral arterial disease)	1
S	Sex (female)	1

The table below shows a suggested anticoagulation strategy based on the score:

Score	Anticoagulation
0	No treatment
1	Males: Consider anticoagulation Females: No treatment
2 or more	Offer anticoagulation

Doctors have always thought carefully about the risk/benefit profile of starting someone on warfarin. A history of falls, old age, alcohol excess and a history of previous bleeding are common things that make us consider whether warfarinisation is in the best interests of the patient. NICE now recommend we formalise this risk assessment using the HASBLED scoring system.

	Risk factor	Points
H	Hypertension, uncontrolled, systolic BP > 160 mmHg	1
A	Abnormal renal function (dialysis or creatinine > 200) Or Abnormal liver function (cirrhosis, bilirubin > 2 times normal, ALT/AST/ALP > 3 times normal)	1 for any renal abnormalities 1 for any liver abnormalities
S	Stroke, history of	1
B	Bleeding, history of bleeding or tendency to bleed	1
L	Labile INRs (unstable/high INRs, time in therapeutic range < 60%)	1
E	Elderly (> 65 years)	1
D	Drugs Predisposing to Bleeding (Antiplatelet agents, NSAIDs) Or Alcohol Use (>8 drinks/week)	1 for drugs 1 for alcohol

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Next

Your next appointment is with a 47-year-old woman. She has come for the results of her ambulatory blood pressure monitoring (ABPM). This was arranged as a clinic reading one month ago was noted to be 146/92 mmHg. The results of the ABPM show an average reading of 126/78 mmHg. What is the most appropriate course of action?



A. Make the final decision based on a clinic blood pressure reading today

- | | |
|----------------------------------|--|
| <input type="radio"/> | B. Offer repeat ABPM in 6 months time |
| <input type="radio"/> | C. Offer repeat ABPM in 12 months time |
| <input type="radio"/> | D. Reassure her that she does not need another blood pressure check for 10 years |
| <input checked="" type="radio"/> | E. Offer to measure the patient's blood pressure at least every 5 years |

Next question

In this situation where the ABPM has shown a sub-threshold average blood pressure NICE recommend offering to measure the patient's blood pressure at least every 5 years.

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
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Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 82 of 156

Next

A 78-year-old woman with no past medical history of note presents with palpitations and shortness of breath, having been unwell for the past three days. Examination reveals an irregularly irregular pulse of 130 bpm, blood pressure of 108/70 mmHg, oxygen saturations of 94% on air and bilateral

lung crepitations in the lower and midzones. She refuses admission to hospital. What is the most appropriate therapy to control her heart rate?

- | | |
|----------------------------------|---------------|
| <input type="radio"/> | A. Amiodarone |
| <input type="radio"/> | B. Flecainide |
| <input type="radio"/> | C. Verapamil |
| <input checked="" type="radio"/> | D. Digoxin |
| <input type="radio"/> | E. Bisoprolol |

Next question

Digoxin is strongly indicated for coexistent atrial fibrillation and heart failure. Beta-blockers should not be introduced until any heart failure has been stabilised - the BNF states: '*beta-blockers should also be avoided in patients with worsening unstable heart failure; care is required when initiating a beta-blocker in those with stable heart failure.*'

Electrical cardioversion is a less attractive option here as the patient has been unwell for three days (hence risk of stroke), although it should always be considered in haemodynamically unstable patients

Atrial fibrillation: rate control and maintenance of sinus rhythm

The Royal College of Physicians and NICE published guidelines on the management of atrial fibrillation (AF) in 2006. The following is also based on the joint American Heart Association (AHA), American College of Cardiology (ACC) and European Society of Cardiology (ESC) 2012 guidelines

Agents used to control rate in patients with atrial fibrillation

- beta-blockers
- calcium channel blockers
- digoxin (not considered first-line anymore as they are less effective at controlling the heart rate during exercise. However, they are the preferred choice if the patient has coexistent heart failure)

Agents used to maintain sinus rhythm in patients with a history of atrial fibrillation

- sotalol
- amiodarone
- flecainide
- others (less commonly used in UK): disopyramide, dofetilide, procainamide, propafenone, quinidine

The table below indicates some of the factors which may be considered when considering either a rate control or rhythm control strategy

Factors favouring rate control	Factors favouring rhythm control
Older than 65 years History of ischaemic heart disease	Younger than 65 years Symptomatic First presentation Lone AF or AF secondary to a corrected precipitant (e.g. Alcohol) Congestive heart failure

Question 83 of 156

Next

Which one of the following statements regarding B-type natriuretic peptide is incorrect?

- ☐ A. Effective treatment for heart failure lowers a patients BNP level
- ☐ B. Acts as a diuretic
- ☐ C. A hormone produced mainly by the left ventricular myocardium in response to strain
- ☐ D. Is a good marker of prognosis in patients with chronic heart failure
- ☒ E. The positive predictive value of BNP is greater than the negative predictive value

Next question

BNP has a good negative predictive value for ventricular dysfunction but has a poor positive predictive value

B-type natriuretic peptide

B-type natriuretic peptide (BNP) is a hormone produced mainly by the left ventricular myocardium in response to strain.

Whilst heart failure is the most obvious cause of raised BNP levels any cause of left ventricular dysfunction such as myocardial ischaemia or valvular disease may raise levels. Raised levels may also be seen due to reduced excretion in patients with chronic kidney disease. Factors which reduce BNP levels include treatment with ACE inhibitors, angiotensin-2 receptor blockers and diuretics.

Effects of BNP

- vasodilator
- diuretic and natriuretic
- suppresses both sympathetic tone and the renin-angiotensin-aldosterone system

Clinical uses of BNP

Diagnosing patients with acute dyspnoea

- a low concentration of BNP(< 100pg/ml) makes a diagnosis of heart failure unlikely, but raised levels should prompt further investigation to confirm the diagnosis
- NICE currently recommends BNP as a helpful test to rule out a diagnosis of heart failure

Prognosis in patients with chronic heart failure

- initial evidence suggests BNP is an extremely useful marker of prognosis

Guiding treatment in patients with chronic heart failure

- effective treatment lowers BNP levels

Screening for cardiac dysfunction

- not currently recommended for population screening

0 / 3

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Next

Theme: Chest pain

- | | |
|----|-----------------------------------|
| A. | Myocardial infarction |
| B. | Gastro-oesophageal reflux disease |
| C. | Anxiety |
| D. | Pleurisy |
| E. | Pneumothorax |
| F. | Pericarditis |
| G. | Myocarditis |
| H. | Dissecting aortic aneurysm |
| I. | Pulmonary embolism |
| J. | Shingles |

For each one of the following scenarios select the most likely diagnosis:

- 84.** A 42-year-old overweight man presents with a two day history of anterior chest pain that is worse on deep inspiration and lying down

The correct answer is Pericarditis

- 85.** A 67-year-old female with a history of chronic lymphocytic leukaemia presents with a 3 day history of burning pain in the right lower chest wall. Clinical examination is unremarkable

The correct answer is Shingles

Pain and paraesthesia often precedes the rash.

86. A 25-year-old man with a history of Marfan's disease presents with sudden onset shortness of breath and pleuritic chest pain

The correct answer is Pneumothorax

[Next question](#)

Chest pain

The table below gives characteristic exam question features for conditions causing chest pain

Condition	Characteristic exam feature
Myocardial infarction	Cardiac-sounding pain <ul style="list-style-type: none">heavy, central chest pain they may radiate to the neck and left armnausea, sweatingelderly patients and diabetics may experience no pain Risk factors for cardiovascular disease
Pneumothorax	History of asthma, Marfan's etc Sudden dyspnoea and pleuritic chest pain
Pulmonary embolism	Sudden dyspnoea and pleuritic chest pain Calf pain/swelling Current combined pill user, malignancy
Pericarditis	Sharp pain relieved by sitting forwards May be pleuritic in nature
Dissecting aortic aneurysm	'Tearing' chest pain radiating through to the back Unequal upper limb blood pressure
Gastro-oesophageal	Burning retrosternal pain

reflux disease	Other possible symptoms include regurgitation and dysphagia	
Musculoskeletal chest pain	One of the most common diagnoses made in the Emergency Department. The pain is often worse on movement or palpation. May be precipitated by trauma or coughing Shingles	Pain often precedes the rash

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Next

A 67-year-old man with recently diagnosed essential hypertension is reviewed four weeks after starting amlodipine 5mg od. He currently takes no other medication. Unfortunately he has had to stop amlodipine due to ankle swelling, which resolved after stopping the medication. What is the most appropriate next step?

- ☐ A. Restart amlodipine and advise him to take it at night and elevate his legs during the day
- ☐ B. Start verapamil
- ☒ C. Start indapamide
- ☐ D. Restart amlodipine and add furosemide 20mg od
- ☐ E. Start ramipril

Next question

This patient has developed ankle oedema after being started on amlodipine. Remember that the oedema is secondary to peripheral arteriolar dilation and redistribution of fluid, not sodium and water retention. Oedema is listed as one of the most common side-effects of amlodipine in the BNF.

In this situation NICE advise ' If a calcium channel blocker is not suitable, for example because of oedema or intolerance, or if there is evidence of heart failure or a high risk of heart failure, offer a thiazide-like diuretic.' Please see page 11 of the NICE guidelines for more details.

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg

- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs


Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

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Next

A 71-year-old man who is known to have atrial fibrillation comes for review. He had a transient ischaemic attack two weeks ago and takes bendroflumethiazide for hypertension but is otherwise well. His latest blood pressure is 124/76 mmHg. You are discussing management options to try and reduce his future risk of having a stroke. What is his CHA₂DS₂-VASc score?

- ☐ A. 1
- ☐ B. 2
- ☐ C. 3
-  ☒ D. 4
- ☐ E. 5

Next question

One point for hypertension, one point for being over the age of 65 years (but under the age of 75 years) and two points ('S2') for the recent TIA.

Atrial fibrillation: anticoagulation

The European Society of Cardiology published updated guidelines on the management of atrial fibrillation in 2012. They suggest using the **CHA₂DS₂-VASc** score to determine the most appropriate anticoagulation strategy. This scoring system superseded the CHADS₂ score.

	Risk factor	Points
C	Congestive heart failure	1
H	Hypertension (or treated hypertension)	1
A₂	Age ≥ 75 years	2
	Age 65-74 years	1
D	Diabetes	1

S₂	Prior Stroke or TIA	2
V	Vascular disease (including ischaemic heart disease and peripheral arterial disease)	1
S	Sex (female)	1

The table below shows a suggested anticoagulation strategy based on the score:

Score	Anticoagulation
0	No treatment
1	Males: Consider anticoagulation Females: No treatment
2 or more	Offer anticoagulation

Doctors have always thought carefully about the risk/benefit profile of starting someone on warfarin. A history of falls, old age, alcohol excess and a history of previous bleeding are common things that make us consider whether warfarinisation is in the best interests of the patient. NICE now recommend we formalise this risk assessment using the HASBLED scoring system.


	Risk factor	Points
H	Hypertension, uncontrolled, systolic BP > 160 mmHg	1
A	Abnormal renal function (dialysis or creatinine > 200) Or Abnormal liver function (cirrhosis, bilirubin > 2 times normal, ALT/AST/ALP > 3 times normal)	1 for any renal abnormalities 1 for any liver abnormalities
S	Stroke, history of	1
B	Bleeding, history of bleeding or tendency to bleed	1
L	Labile INRs (unstable/high INRs, time in therapeutic range < 60%)	1
E	Elderly (> 65 years)	1

D	Drugs Predisposing to Bleeding (Antiplatelet agents, NSAIDs)	1 for drugs
	Or Alcohol Use (>8 drinks/week)	1 for alcohol

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Next

A 65-year-old man is discharged from hospital following a thrombolysed ST-elevation myocardial infarction. Other than a history of depression he has no past medical history of note. Examination of his cardiorespiratory system today was normal. His stay on the coronary care unit was complicated by the development of dyspnoea and an echo show a reduced left ventricular ejection fraction. Other than standard treatment with an ACE inhibitor, beta-blocker, aspirin, clopidogrel and statin, what other type of drug should he be taking?

- ☐ A. Angiotensin 2 receptor antagonist
- ☐ B. Potassium channel activator
-  ☒ C. Aldosterone antagonist
- ☐ D. Thiazide diuretic
- ☐ E. Loop diuretic

Next question

An aldosterone antagonist is recommended by current NICE guidelines as the patient has a reduced left ventricular ejection fraction. A loop diuretic is not indicated unless there is evidence of fluid overload.

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)

- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

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Next

Which one of the following statements regarding the assessment of patients with suspected cardiac chest pain is true?

- ☐ A. Patients with an estimated coronary artery disease risk of greater than 90% should be offered a coronary angiogram
- ☒ B. CT calcium scoring should be used for patients with an estimated coronary artery disease risk of 10-29%
- ☐ C. An exercise ECG is the first-line test for the majority of patients
- ☐ D. Continuous or prolonged chest pain makes a diagnosis of angina more likely
- ☐ E. An abnormal resting ECG in a patient with chest pain can be used to diagnose coronary artery disease

Next question

An abnormal resting ECG in a patient with chest pain may indicate other diagnoses, for example pericarditis or hypertrophic obstructive cardiomyopathy.

Chest pain: assessment of patients with suspected cardiac chest pain

NICE issued guidelines in 2010 on the 'Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin'.

Below is a brief summary of the key points. Please see the link for more details.

Patients presenting with acute chest pain

Immediate management of suspected acute coronary syndrome (ACS)

- glyceryl trinitrate
- aspirin 300mg. NICE do not recommend giving other antiplatelet agents (i.e. Clopidogrel) outside of hospital
- do not routinely give oxygen, only give if sats < 94%*
- perform an ECG as soon as possible but do not delay transfer to hospital. A normal ECG does not exclude ACS

Referral

- current chest pain or chest pain in the last 12 hours with an abnormal ECG: emergency admission
- chest pain 12-72 hours ago: refer to hospital the same-day for assessment
- chest pain > 72 hours ago: perform full assessment with ECG and troponin measurement before deciding upon further action

*NICE suggest the following in terms of oxygen therapy:

- do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:
- people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94-98%
- people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88-92% until blood gas analysis is available.

Patients presenting with stable chest pain

With all due respect to NICE the guidelines for assessment of patients with stable chest pain are rather complicated. They suggest an approach where the risk of a patient having coronary artery disease (CAD) is calculated based on their symptoms (whether they have typical angina, atypical angina or non-anginal chest pain), age, gender and risk factors.

NICE define anginal pain as the following:

- 1. constricting discomfort in the front of the chest, neck, shoulders, jaw or arms
- 2. precipitated by physical exertion
- 3. relieved by rest or GTN in about 5 minutes
- patients with all 3 features have typical angina
- patients with 2 of the above features have atypical angina
- patients with 1 or none of the above features have non-anginal chest pain

The risk tables are not reproduced here but can be found by clicking on the link.

If patients have typical anginal symptoms and a risk of CAD is greater than 90% then no further diagnostic testing is required. It should be noted that all men over the age of 70 years who have

typical anginal symptoms fall into this category.

For patients with an estimated risk of 10-90% the following investigations are recommended. Note the absence of the exercise tolerance test:

Estimated likelihood of CAD	Diagnostic testing
61-90%	Coronary angiography
30-60%	Functional imaging, for example: <ul style="list-style-type: none">• myocardial perfusion scan with SPECT• stress echocardiography• first-pass contrast-enhanced magnetic resonance (MR) perfusion• MR imaging for stress-induced wall motion abnormalities.
10-29%	CT calcium scoring

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Next

You review a 65-year-old man who was recently diagnosed with angina pectoris. He is currently taking aspirin, simvastatin, atenolol and nifedipine. Despite this therapy he is still having to use his GTN spray regularly. What is the most appropriate next step in management?

- ☐ A. Add an ACE inhibitor and titrate to the maximum tolerated dose
- ☐ B. Offer transcutaneous electrical nerve stimulation (TENS)
- ☐ C. Add nicorandil and titrate to the maximum tolerated dose
- ☒ D. Add isosorbide mononitrate MR and refer to cardiology for consideration of PCI or CABG
- ☐ E. Add isosorbide mononitrate MR and titrate to the maximum tolerated dose

Next question

NICE guidelines suggest that if a patient requires a third anti-anginal they should be referred for

consideration of a more definitive intervention (PCI or CABG). Whilst ACE inhibitors may have a role in some patients with stable angina it would not improve his anginal symptoms.

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'
- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

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Next

A 72-year-old woman with a 30 year history of type 2 diabetes mellitus comes for review. She was diagnosed with chronic kidney disease (secondary to diabetes) 8 years ago and has seen declining renal function since. Her current medication includes ramipril 10mg od, amlodipine 10mg od, simvastatin 40mg on and Novomix 30 insulin bd.

Her most recent renal function tests show the following:

Na^+	139 mmol/l
K^+	5.3 mmol/l
Urea	15.2 mmol/l
Creatinine	256 $\mu\text{mol/l}$

Blood pressure in clinic is 156/88 mmHg and this is confirmed on a second reading. What should be done regarding her blood pressure medication?

- ☐ A. Add bisoprolol
- ☒ B. Add indapamide
- ☐ C. Add doxazosin
- ☐ D. Add spironolactone
- ☐ E. Add an angiotensin II receptor blocker

Next question

Tight blood pressure remains a key management aim in patients with diabetic nephropathy. ACE inhibitors are clearly the most evidence based management in this arena but her blood pressure is

persistently high. If we look at the NICE guidelines the next step would be the addition of a thiazide based diuretic (e.g. indapamide) and there is no reason not to follow these recommendations in this situation.

Spironolactone and angiotensin II receptor blockers may risk precipitating hyperkalaemia.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP $\geq 140/90$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 135/85$ mmHg
Stage 2 hypertension	Clinic BP $\geq 160/100$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 150/95$ mmHg
Severe hypertension	Clinic systolic BP ≥ 180 mmHg, or clinic diastolic BP ≥ 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced

- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

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Next

A patient with known heart failure has slight limitation of physical activity. She is comfortable at rest but ordinary activities such as walking to the local shops results in fatigue, palpitations or dyspnoea. What New York Heart Association class best describes the severity of their disease?

- ☐ A. NYHA Class 0
- ☐ B. NYHA Class I
-  ☒ C. NYHA Class II
- ☐ D. NYHA Class III
- ☐ E. NYHA Class IV

Next question

Heart failure: NYHA classification

The New York Heart Association (NYHA) classification is widely used to classify the severity of heart failure:

NYHA Class I

- no symptoms
- no limitation: ordinary physical exercise does not cause undue fatigue, dyspnoea or palpitations

NYHA Class II

- mild symptoms
- slight limitation of physical activity: comfortable at rest but ordinary activity results in fatigue, palpitations or dyspnoea

NYHA Class III

- moderate symptoms
- marked limitation of physical activity: comfortable at rest but less than ordinary activity results in symptoms

NYHA Class IV

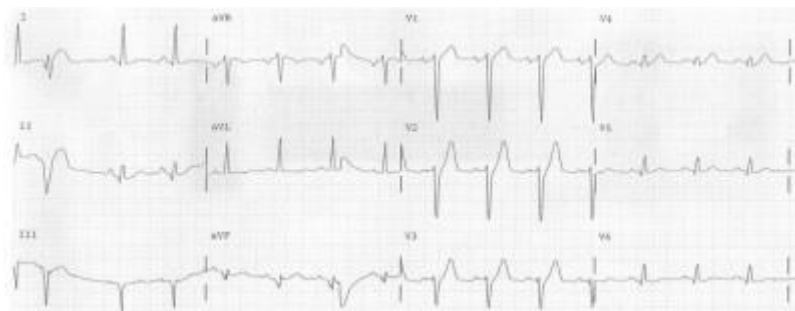
- severe symptoms
- unable to carry out any physical activity without discomfort: symptoms of heart failure are present even at rest with increased discomfort with any physical activity

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Next

A 56-year-old woman presents with a three week history of intermittent chest pains. She is normally fit and well and takes no regular medications. The pains are described as 'acid burning' in the retrosternal area and seem to have no pattern, being present both at rest and also during exertion. She last experienced the pain this morning whilst walking to the surgery but is currently pain free. Examination of the cardiorespiratory system is unremarkable, with a blood pressure of 130/76 mmHg,

An ECG is done in the surgery.



© Image used on license from [Dr Smith, University of Minnesota](#)



What is the most appropriate management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Start the patient on aspirin 75mg od, given a trial of GTN and review the patient in one week |
| <input type="radio"/> | B. Reassure the patient that the ECG is normal and review next week |
| <input type="radio"/> | C. Make a direct referral for an exercise tolerance test |
| <input checked="" type="radio"/> | D. Admit the patient to hospital |
| <input type="radio"/> | E. Make an urgent referral to the Rapid Access Chest Pain clinic |

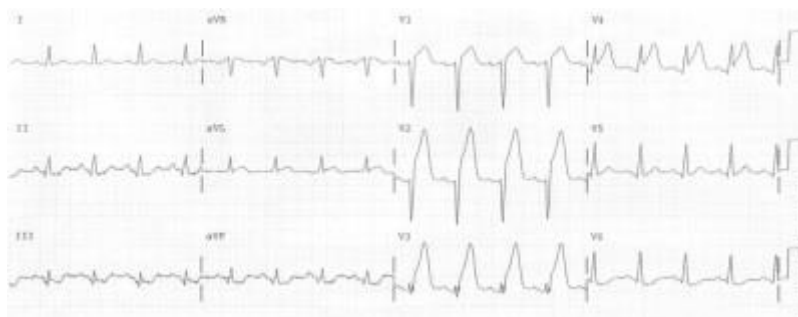
Next question

As a GP we are certainly not expected to be experts at reading ECGs. We do however need to recognise what is probably normal and what is not. Whilst the computer analysis which accompanies most ECGs nowadays is often instructive it is by no means infallible.

The T waves in V2 + V3 are very large or 'hyperacute' to use the cardiology lingo. This is often the first change seen with myocardial ischaemia.

If you did not have access to an ECG in surgery, how would you manage the patient based on the history alone? Let us know your thoughts.

This patients ECG 30 minutes later is shown below:



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ECG: myocardial ischaemia

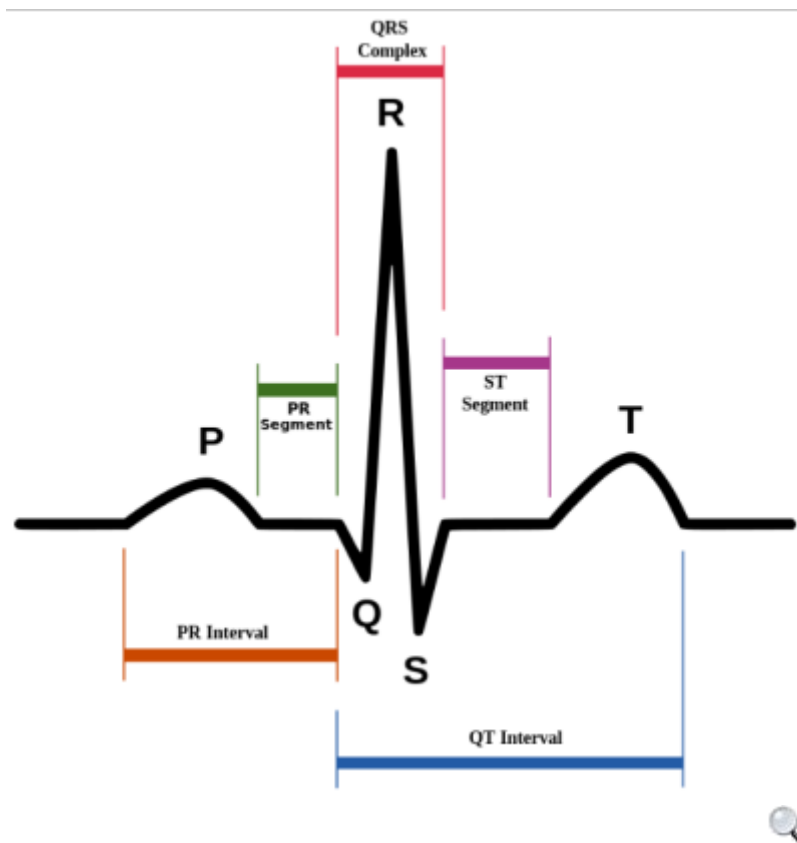
One of the main uses of the ECG is to determine whether a patient is having a cardiac event in the context of chest pain. A wide variety of changes can be seen depending on what type of ischaemic event is happening, where it is happening and when it happened.

Acute myocardial infarction (MI)

- hyperacute T waves are often the first sign of MI but often only persists for a few minutes
- ST elevation may then develop
- the T waves typically become inverted within the first 24 hours. The inversion of the T waves can last for days to months
- pathological Q waves develop after several hours to days. This change usually persists indefinitely

Definition of ST elevation*

- new ST elevation at the J-point in two contiguous leads with the cut-off points: ≥ 0.2 mV in men or ≥ 0.15 mV in women in leads V2-V3 and/or ≥ 0.1 mV in other leads



*Thygesen K et al. Universal definition of myocardial infarction. *Circulation* 2007 Nov 27; 116(22):2634-53. doi:10.1161/CIRCULATIONAHA.107.187397 pmid:1795128

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Next

An 82-year-old man is reviewed. He is known to have ischaemic heart disease and is still getting regular attacks of angina despite taking atenolol 100mg od. Examination of his cardiovascular system is unremarkable with a pulse of 72 bpm and a blood pressure of 158/96 mmHg. What is the most appropriate next step in management?

- ☐ A. Add verapamil 80mg tds
- ☐ B. Add nicorandil 10mg bd
- ☐ C. Add diltiazem 60mg tds
-  ☒ D. Add nifedipine MR 30mg od
- ☐ E. Add isosorbide mononitrate 30mg bd

Next question

NICE guidelines recommend adding a calcium channel blocker for angina which is not adequately controlled with beta-blocker monotherapy. Verapamil is contraindicated whilst taking a beta-blocker and diltiazem should be used with caution due to the risk of bradycardia.

The starting dose of isosorbide mononitrate is 10mg bd.

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'
- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that

beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)

- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

Question 96 of 156

Next

A 62-year-old female is reviewed in the nurse-led heart failure clinic. Despite current treatment with furosemide, bisoprolol, enalapril and spironolactone she remains breathless on minimal exertion. On examination the chest is clear to auscultation and there is minimal ankle oedema

Recent results are as follows:

ECG	Sinus rhythm, rate 84 bpm
Chest x-ray	Cardiomegaly, clear lung fields
Echo	Ejection fraction 35%

A combination of isosorbide dinitrate with hydralazine has been tried recently but had to be stopped due to side-effects. What additional medication would best help her symptoms?

- ☐ A. Bosentan
- ☐ B. Isosorbide mononitrate
- ☐ C. Diltiazem
- ☐ D. Ivabradine
- ☒ E. Digoxin

Next question

Digoxin may be useful in this situation whether the patient is in atrial fibrillation or not. Whilst it has not been shown to be of prognostic benefit it may help reduce symptoms. In the United States a large proportion of patients with heart failure take digoxin for this reason. Another option to consider in such a patient would be a biventricular pacemaker (cardiac resynchronization therapy)

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- ACE inhibitors (SAVE, SOLVD, CONSENSUS)
- spironolactone (RALES)
- beta-blockers (CIBIS)
- hydralazine with nitrates (VHEFT-1)

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered
- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine

*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 97 of 156

Next

You review an 82-year-old woman in clinic. Last month she had a one-off blood pressure reading of 150/92 mmHg and was offered ambulatory blood pressure monitoring. This shows an average reading of 146/94 mmHg. She has no significant past medical history of note other than hypothyroidism. Her 10-year cardiovascular risk is calculated to be 16%. What is the most appropriate management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Arrange further ambulatory blood pressure monitoring |
| <input type="radio"/> | B. Start a thiazide-type diuretic |
| <input checked="" type="radio"/> | C. Give lifestyle advice and repeat blood pressure in 6 months |
| <input type="radio"/> | D. Start an ACE inhibitor |



E. Start a calcium channel blocker

[Next question](#)

NICE now only recommend diagnosing people over the age of 80 years as hypertensive if they have stage 2 hypertension (ABPM daytime average or HBPM average BP \geq 150/95 mmHg). Remember that the diagnostic criteria are different from the blood pressure targets once treatment has started, which for people over the age of 80 years are:

- clinic readings $<$ 150/90 mmHg
- ABPM/HBPM $<$ 145/85 mmHg

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.*'

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg

Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg
----------------------------	--

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP $\geq 140/90$ mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)

- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 98 of 156

Next

A 72-year-old man is started on amlodipine 5mg od for hypertension. He has no other past medical history of note and routine bloods (including fasting glucose) and ECG were normal. What should his target blood pressure be once on treatment?

- | | |
|----------------------------------|----------------|
| <input type="radio"/> | A. 130/80 mmHg |
| <input type="radio"/> | B. 140/80 mmHg |
| <input type="radio"/> | C. 140/85 mmHg |
| <input checked="" type="radio"/> | D. 140/90 mmHg |
| <input type="radio"/> | E. 150/90 mmHg |

Next question

Blood pressure target (based on clinic readings) for patients < 80 years - 140/90 mmHg

The NICE target differs from the Quality and Outcomes Framework (QOF) indicator for GPs working in England, which specify a target below 150/90 mmHg.

The April 2012 AKT feedback report commented: '*Candidates had some difficulty with items related to the new NICE guidelines on diagnosis and treatment of hypertension, particularly with regard to*

ambulatory blood pressure monitoring. Hypertension is clearly a common and important topic with which candidates should be very familiar especially with the change in guidelines.'

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
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Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if \leq 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients $<$ 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients $<$ 55-years-old: ACE inhibitor (A)
- patients $>$ 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

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Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

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Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 99 of 156

Next

A 53-year-old man presents after suffering a 'panic attack' whilst at work. He describes feeling very hot then having to go outside as he felt 'unable to focus' and like the 'world was closing in on him'. His symptoms have now largely settled. On examination pulse is 78/min, blood pressure 188/112 mmHg, respiratory rate 14/min. Cardiovascular examination is otherwise unremarkable. Some small

retinal haemorrhages are noted on fundoscopy. His PHQ-9 score is 15/27. What is the most appropriate course of action?

- ☐ A. Start propranolol
- ☐ B. Refer for cognitive behavioural therapy
- ☐ C. Start an ACE inhibitor
- ☐ D. Arrange ambulatory blood pressure monitoring
- ☒ E. Admit for a same day assessment of his blood pressure

Next question

This patient has severe hypertension (as defined by NICE) and retinal haemorrhages. NICE recommend same day referral and assessment in this scenario. The 'panic attack' may be coincidental but an underlying phaeochromocytoma may need to be excluded.

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP $\geq 140/90$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 135/85$ mmHg
Stage 2 hypertension	Clinic BP $\geq 160/100$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 150/95$ mmHg
Severe hypertension	Clinic systolic BP ≥ 180 mmHg, or clinic diastolic BP ≥ 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 100 of 156

Next

A 62-year-old female with no past medical history is admitted to hospital with a left-sided hemiparesis. Examination reveals that she is in atrial fibrillation. CT scan of her brain shows a cerebral infarction. What is the most appropriate anticoagulation strategy for this patient?

- ☐ A. Life-long warfarin, started immediately
- ✓ ☒ B. Aspirin started immediately switching to life-long warfarin after 2 weeks
- ☐ C. Life-long aspirin, started immediately
- ☐ D. Life-long aspirin started after 2 weeks
- ☐ E. 6 months of warfarin, started immediately

[Next question](#)

Atrial fibrillation: post-stroke

NICE issued guidelines on atrial fibrillation (AF) in 2006. They included advice on the management of patients with AF who develop a stroke or transient-ischaemic attack (TIA).

Recommendations include:

- following a stroke or TIA warfarin should be given as the anticoagulant of choice. Aspirin/dipyridamole should only be given if needed for the treatment of other comorbidities
- in acute stroke patients, in the absence of haemorrhage, anticoagulation therapy should be commenced after 2 weeks. If imaging shows a very large cerebral infarction then the initiation of anticoagulation should be delayed

Question 101 of 156

[Next](#)

Which one of the following statements regarding prosthetic heart valves is correct?

- ☐ A. Antibiotic prophylaxis is still recommended for patients with mechanical valves who have dental procedures
- ☐ B. The majority of mechanical valves are of the ball-and-cage type
- ☐ C. Bioprosthetic valves are now usually obtained from human cadavers
- ☐ D. The target INR for patients with mechanical aortic valves is 3.0-4.0



E. Mechanical valves have a lower failure rate than bioprosthetic valves

[Next question](#)

Prosthetic heart valves

The most common valves which need replacing are the aortic and mitral valve. There are two main options for replacement: biological (bioprosthetic) or mechanical.

Biological (bioprosthetic) valves	Mechanical valves
<p>Usually bovine or porcine in origin</p> <p>Major disadvantage is structural deterioration and calcification over time. Most older patients (> 65 years for aortic valves and > 70 years for mitral valves) receive a bioprosthetic valve</p> <p>Long-term anticoagulation not usually needed. Warfarin may be given for the first 3 months depending on patient factors. Low-dose aspirin is given long-term.</p>	<p>The most common type now implanted is the bileaflet valve. Ball-and-cage valves are rarely used nowadays</p> <p>Mechanical valves have a low failure rate</p> <p>Major disadvantage is the increased risk of thrombosis meaning long-term anticoagulation is needed. Aspirin is normally given in addition unless there is a contraindication.</p> <p>Target INR</p> <ul style="list-style-type: none">• aortic: 2.0-3.0• mitral: 2.5-3.5

Following the 2008 NICE guidelines for prophylaxis of endocarditis antibiotics are no longer recommended for common procedures such as dental work.

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Next

You are doing the annual review for a 67-year-old man who has type 2 diabetes. His glycaemic control is reasonable with metformin therapy; the latest HbA1c is 54 mmol/mol (7.1%). A few weeks ago he was noted to have a clinic blood pressure reading of 152/90 mmHg. A 24 hour blood pressure monitor was requested. The report shows his average blood pressure was 142/88 mmHg. What is the most appropriate course of action?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Do nothing for now, monitor his blood pressure regularly |
| <input checked="" type="radio"/> | B. Start an ACE inhibitor |
| <input type="radio"/> | C. Start a calcium channel blocker |
| <input type="radio"/> | D. Repeat the 24 hour blood pressure monitor in 4-8 weeks time |
| <input type="radio"/> | E. Request an ultrasound of his kidneys |

Next question

ACE inhibitors are first-line for hypertension in diabetics, irrespective of the patients age

This patient has stage 1 hypertension as defined by NICE. He should however be treated because he has underlying diabetes.

The first-line treatment for a patient aged > 55 years is a calcium channel blocker. However, in patients with diabetes ACE inhibitors are used first-line due to their renoprotective effect.

Diabetes mellitus: hypertension management

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

A 2013 Cochrane review casted doubt on the wisdom of lower blood pressure targets for patients with diabetes. It compared patients who had tight blood pressure control (targets < 130/85 mmHg) with more relaxed control (< 140-160/90-100 mmHg). Patients who were more tightly controlled had a slightly reduced rate of stroke but otherwise outcomes were not significantly different.


Because ACE-inhibitors have a renoprotective effect in diabetes they are the first-line antihypertensives recommended for NICE. Patients of African or Caribbean family origin should be offered an ACE-inhibitor plus either a thiazide diuretic or calcium channel blocker. Further management then reverts to that of non-diabetic patients, as discussed earlier in the module.

Remember that autonomic neuropathy may result in more postural symptoms in patients taking antihypertensive therapy.

The routine use of beta-blockers in uncomplicated hypertension should be avoided, particularly when given in combination with thiazides, as they may cause insulin resistance, impair insulin secretion and alter the autonomic response to hypoglycaemia.

Next

An 84-year-old man comes for review. Four weeks ago an opportunistic blood pressure reading was taken and recorded as 150/92 mmHg. You therefore arranged ambulatory blood pressure monitoring (ABPM) along with a standard hypertension work-up. You did not calculate his 10-year cardiovascular risk on account of his age. The following results were obtained:

Na ⁺	141 mmol/l
K ⁺	4.2 mmol/l
Urea	6.5 mmol/l
Creatinine	101  mol/l
Total cholesterol	4.9 mmol/l
HDL cholesterol	1.2 mmol/l
Fasting glucose	5.5 mmol/l

Urine dipstick was normal. The ECG showed sinus rhythm, 72 bpm and first degree heart block.

The daytime average blood pressure reading was 145/80 mmHg. What is the most appropriate course of action?



- ☒ A. Diagnose stage 1 hypertension and advise about lifestyle changes
- ☐ B. Start treatment with an ACE inhibitor
- ☐ C. Start treatment with a calcium channel blocker

☐ D. Start treatment with a thiazide-like diuretic

☐ E. Repeat the ABPM

Next question

Stage 1 hypertension is defined by an ABPM reading of $\geq 135/85$ mmHg, with stage 2 hypertension having a cut-off of $\geq 150/95$ mmHg.

This patient therefore has stage 1 hypertension. As they are > 80 years they do not need treatment.

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

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Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1	Clinic BP $\geq 140/90$ mmHg and subsequent ABPM daytime average or HBPM average BP

Stage	Criteria
hypertension	$\geq 135/85$ mmHg
Stage 2 hypertension	Clinic BP $\geq 160/100$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 150/95$ mmHg
Severe hypertension	Clinic systolic BP ≥ 180 mmHg, or clinic diastolic BP ≥ 110 mmHg

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NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

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- immediate treatment should be considered
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Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater


ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 104 of 156

Next

A 71-year-old patient presents to the Emergency Department with a 30 minute history of crushing central chest pain. ECG shows tall R waves in V1-2. Which coronary territory is likely to be affected?

- ☐ A. Lateral
-  ☒ B. Posterior

- ☐ C. Anteroseptal
- ☐ D. Anterolateral
- ☐ E. Inferior

[Next question](#)

ECG: coronary territories

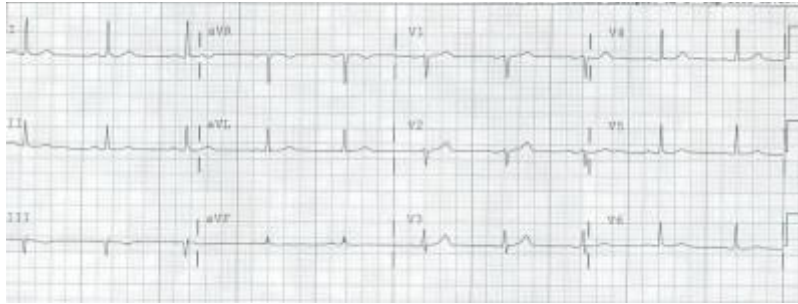
The table below shows the correlation between ECG changes and coronary territories:

	ECG changes	Coronary artery
Anteroseptal	V1-V4	Left anterior descending
Inferior	II, III, aVF	Right coronary
Anterolateral	V4-6, I, aVL	Left anterior descending or left circumflex
Lateral	I, aVL +/- V5-6	Left circumflex
Posterior	Tall R waves V1-2	Usually left circumflex, also right coronary

Question 105 of 156

[Next](#)

A 61-year-old woman comes for review. Last month she was found to have a blood pressure of 156/94 mmHg. As a result you arranged 24-hour blood pressure monitoring, some blood tests and an ECG:



© Image used on license from [Dr Smith, University of Minnesota](#)



What is shown on the ECG?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Left ventricular hypertrophy |
| <input type="radio"/> | B. Right bundle branch block |
| <input checked="" type="radio"/> | C. Normal ECG |
| <input type="radio"/> | D. Wolff-Parkinson White syndrome |
| <input type="radio"/> | E. Previous inferior myocardial infarction |

Next question

This is a normal ECG. There are no changes suggestive of any of the above conditions. The PR interval is rather long but is at the upper limit of normal. There is also a Q wave in lead III, but this again is a normal variant (even deep waves > 2mm may be a normal variant in this lead).

The May 2011 AKT feedback report stated: '*... candidates should remember that some of the items require them to recognise clinical or laboratory findings as normal.*'

ECG: normal variants

The following ECG changes are considered normal variants in an athlete:

- sinus bradycardia
- junctional rhythm
- first degree heart block
- Wenckebach phenomenon

Question 106 of 156

Next

You have ordered a B-type natriuretic peptide (BNP) test on a patient with suspected heart failure. It has come back as being slightly elevated. Which one of the following factors may account for a falsely elevated BNP?

- | | |
|----------------------------------|--------------------------|
| <input type="radio"/> | A. ACE inhibitor therapy |
| <input type="radio"/> | B. Beta-blocker therapy |
| <input type="radio"/> | C. Furosemide therapy |
| <input type="radio"/> | D. Obesity |
| <input checked="" type="radio"/> | E. COPD |

Next question

Heart failure: diagnosis

NICE issued updated guidelines on diagnosis and management in 2010. The choice of investigation is determined by whether the patient has previously had a myocardial infarction or not.

Previous myocardial infarction

- arrange echocardiogram within 2 weeks

No previous myocardial infarction

- measure serum natriuretic peptides (BNP)
- if levels are 'high' arrange echocardiogram within 2 weeks
- if levels are 'raised' arrange echocardiogram within 6 weeks

Serum natriuretic peptides

B-type natriuretic peptide (BNP) is a hormone produced mainly by the left ventricular myocardium in response to strain. Very high levels are associated with a poor prognosis.

	BNP	NTproBNP
High levels	> 400 pg/ml (116 pmol/litre)	> 2000 pg/ml (236 pmol/litre)
Raised levels	100-400 pg/ml (29-116 pmol/litre)	400-2000 pg/ml (47-236 pmol/litre)
Normal levels	< 100 pg/ml (29 pmol/litre)	< 400 pg/ml (47 pmol/litre)

Factors which alter the BNP level:

Increase BNP levels	Decrease BNP levels
Left ventricular hypertrophy Ischaemia Tachycardia Right ventricular overload Hypoxaemia (including pulmonary embolism) GFR < 60 ml/min Sepsis COPD Diabetes Age > 70 Liver cirrhosis	Obesity Diuretics ACE inhibitors Beta-blockers Angiotensin 2 receptor blockers Aldosterone antagonists

Question 107 of 156

Next

NICE have produced guidelines on the management of patients following a myocardial infarction. What do they recommend in terms of exercise?

- ☐ A. Physically activity 1-2 times a week which raises the heart rate above 110/min for at least 30 minutes
- ☐ B. A brisk walk 2-3 times a week for at least 1 hour



C. Physically activity for 20-30 minutes a day to the point of slight breathlessness



D. Physically activity 2-3 times a week which raises the heart rate above 100/min for at least 30 minutes



E. Physically activity 1-2 times a week which raises the heart rate above 120/min for at least 30 minutes

Next question

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel

- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

Question 108 of 156

Next

A 70-year-old woman with a history of type 2 diabetes mellitus and hypertension is reviewed in clinic. You can see from the records there is no evidence of diabetic retinopathy, chronic kidney disease or cardiovascular disease.

Her current medication is as follows:


- simvastatin 20mg on
- ramipril 10mg od
- amlodipine 5mg od
- metformin 1g bd

Recent blood results are shown below:

Na ⁺	142 mmol/l
K ⁺	4.4 mmol/l
Urea	7.2 mmol/l
Creatinine	86 μ mol/l
HbA1c	45 mmol/mol (6.3%)

Urine dipstick shows no proteinuria. Her blood pressure today in clinic is 134/76 mmHg.

What is the most appropriate course of action?

- ☐ A. Add gliclazide
- ☐ B. Increase amlodipine
- ☐ C. Increase ramipril
- ☐ D. Add losartan
-  ☒ E. No changes to medication required

Next question

Her diabetic control is good - NICE do not advocate changing treatment at this stage unless the HbA1c is $\geq 6.5\%$.

As she has no complications from her diabetes the blood pressure target is $< 140/80$ mmHg. No changes are therefore required to her antihypertensive regime.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP $\geq 140/90$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 135/85$ mmHg
Stage 2 hypertension	Clinic BP $\geq 160/100$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 150/95$ mmHg

Stage	Criteria
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if $<$ 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients $<$ 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients $<$ 55-years-old: ACE inhibitor (A)
- patients $>$ 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP $\geq 140/90$ mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I

- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 109 of 156

Next

A patient attends the local walk-in centre with central crushing chest pain. The nurse phones 999 and performs an ECG which shows ST elevation in leads II, III and aVF. His blood pressure is 130/70 mmHg, pulse 90 / min and oxygen saturations of 96%. What is the most appropriate management whilst waiting for the ambulance?

- ✓ ☒ A. Aspirin 300mg + sublingual glyceryl trinitrate
- ☐ B. Oxygen + aspirin 300mg + sublingual glyceryl trinitrate
- ☐ C. Aspirin 300mg + clopidogrel 300mg + sublingual glyceryl trinitrate
- ☐ D. Oxygen + aspirin 300mg + clopidogrel 300mg + sublingual glyceryl trinitrate
- ☐ E. Aspirin 300mg + lansoprazole 30mg + sublingual glyceryl trinitrate

Next question

Oxygen is not now recommended unless a patients' oxygen saturations are less than 94%.

Chest pain: assessment of patients with suspected cardiac chest pain

NICE issued guidelines in 2010 on the 'Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin'.

Below is a brief summary of the key points. Please see the link for more details.

Patients presenting with acute chest pain

Immediate management of suspected acute coronary syndrome (ACS)

- glyceryl trinitrate
- aspirin 300mg. NICE do not recommend giving other antiplatelet agents (i.e. Clopidogrel) outside of hospital
- do not routinely give oxygen, only give if sats < 94%*
- perform an ECG as soon as possible but do not delay transfer to hospital. A normal ECG does not exclude ACS

Referral

- current chest pain or chest pain in the last 12 hours with an abnormal ECG: emergency admission
- chest pain 12-72 hours ago: refer to hospital the same-day for assessment
- chest pain > 72 hours ago: perform full assessment with ECG and troponin measurement before deciding upon further action

*NICE suggest the following in terms of oxygen therapy:

- do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:
- people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94-98%
- people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88-92% until blood gas analysis is available.

Patients presenting with stable chest pain

With all due respect to NICE the guidelines for assessment of patients with stable chest pain are rather complicated. They suggest an approach where the risk of a patient having coronary artery disease (CAD) is calculated based on their symptoms (whether they have typical angina, atypical angina or non-anginal chest pain), age, gender and risk factors.

NICE define anginal pain as the following:

- 1. constricting discomfort in the front of the chest, neck, shoulders, jaw or arms
- 2. precipitated by physical exertion

- 3. relieved by rest or GTN in about 5 minutes
- patients with all 3 features have typical angina
- patients with 2 of the above features have atypical angina
- patients with 1 or none of the above features have non-anginal chest pain

The risk tables are not reproduced here but can be found by clicking on the link.

If patients have typical anginal symptoms and a risk of CAD is greater than 90% then no further diagnostic testing is required. It should be noted that all men over the age of 70 years who have typical anginal symptoms fall into this category.

For patients with an estimated risk of 10-90% the following investigations are recommended. Note the absence of the exercise tolerance test:

Estimated likelihood of CAD	Diagnostic testing
61-90%	Coronary angiography
30-60%	Functional imaging, for example: <ul style="list-style-type: none"> • myocardial perfusion scan with SPECT • stress echocardiography • first-pass contrast-enhanced magnetic resonance (MR) perfusion • MR imaging for stress-induced wall motion abnormalities.
10-29%	CT calcium scoring

Question 110 of 156

Next

A 71-year-old woman presents for advice. She is due to fly to Australia in the next few weeks to visit her daughter who has emigrated. She is however worried about the risk of deep vein thrombosis as she was diagnosed with this around 40-years-ago when she was pregnant with her second child. There are however no other major risk factors for venous thromboembolism. What is the most appropriate advice to give?



A. Drink 500ml more water than normally would

- | | |
|----------------------------------|--|
| <input type="radio"/> | B. Advise her that the risks of flying are too high and she should cancel the trip |
| <input checked="" type="radio"/> | C. Wear compression stockings |
| <input type="radio"/> | D. Take aspirin 75mg od, starting two days before the flight |
| <input type="radio"/> | E. Prescribe low-molecular weight heparin, starting one before the flight |

Next question

This lady is clearly someone at a higher risk of travel related thrombosis, given her previous DVT, long haul destination and age. The most appropriate advice is therefore to wear compression stockings.

Travel-related thrombosis

It is not uncommon for us to be asked by patients whether they should take aspirin prior to a long haul flight. So called 'economy class syndrome' as a concept has increased in the public's mind over the past 10 years or so. It is certainly true that long-haul air travel is associated with an increased risk of VTE. A 2001 study in the New England Journal of Medicine¹ showed the following risk of pulmonary embolism:

- 0.01 cases per million for travel under 5,000 km
- 1.5 cases per million for travel between 5,000 - 10,000 km
- 4.8 cases per million for travel over 10,000 km

The Civil Aviation Authority do not give specific guidance relating to venous thromboembolism. The British Committee for Standards in Haematology did however produce guidelines in 2005 as did SIGN in 2010 and Clinical Knowledge Summaries (CKS) in 2013. Unfortunately, there is no universal agreement on what to advise patients.

The most recent CKS guidelines advise that we take a risk based approach. For example, a patient with no major risk factors for VTE (i.e. the average person) then no special measures are needed.

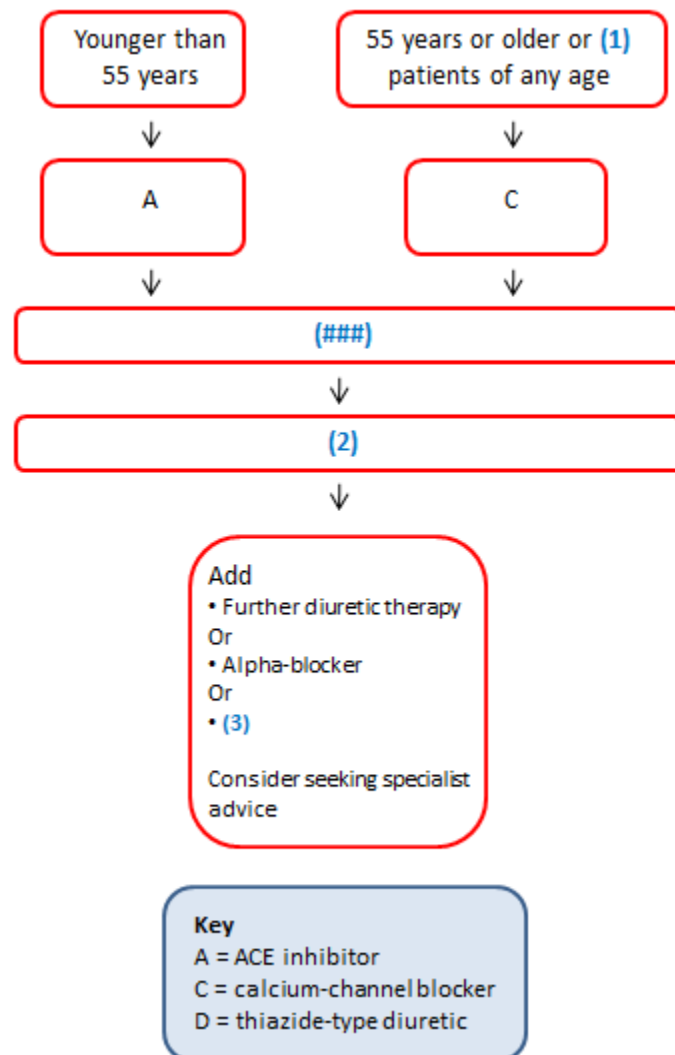
Patients with major risk factors should consider wearing anti-embolism stockings. These can either be bought by the patient or prescribed (class I). Clearly if the risk is very high (e.g. a long-haul flight following recent major surgery) then consideration should be given to delaying the flight or specialist advice sought regarding the use of low-molecular weight heparin.

All guidelines agree there is no role for aspirin in low, medium or high risk patients.

Question 111-113 of 156

Next

Theme: NICE hypertension guidelines



- A. Asian
- B. Afro-Caribbean
- C. Frail
- D. House-bound

- E.** A + C + D
- F.** A + C + D or A + B if active lifestyle
- G.** A + C + D or A + B + D if active lifestyle
- H.** Direct renin inhibitor
- I.** Centrally acting hypertensive
- J.** Beta blocker

The diagram below is taken from the NICE guidelines on the management of hypertension:

111. Gap (1)

The correct answer is Afro-Caribbean

112. Gap (2)

The correct answer is A + C + D

113. Gap (3)

The correct answer is Beta blocker

[Next question](#)

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages

- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if $<$ 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55-years-old: ACE inhibitor (A)
- patients > 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

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- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors


- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 114 of 156

Next

A 76-year-old man is reviewed. He was recently admitted after being found to be in atrial fibrillation. This was his second episode of atrial fibrillation. He also takes ramipril for hypertension but has no other history of note. During admission he was warfarinised and discharged with planned follow-up in the cardiology clinic. However, on review today he is found to be in sinus rhythm. What should happen regarding anticoagulation?

- ☐ A. Stop warfarin
- ☐ B. Continue warfarin for 1 month

- ☐ C. Stop warfarin + start aspirin
-  ☒ D. Continue lifelong warfarin
- ☐ E. Continue warfarin for 6 months

Next question

Warfarin should be continued indefinitely as this is his second episode of atrial fibrillation and he has risk factors for stroke (age, hypertension)

Atrial fibrillation: anticoagulation

The European Society of Cardiology published updated guidelines on the management of atrial fibrillation in 2012. They suggest using the **CHA₂DS₂-VASc** score to determine the most appropriate anticoagulation strategy. This scoring system superceded the CHADS₂ score.

	Risk factor	Points
C	Congestive heart failure	1
H	Hypertension (or treated hypertension)	1
A₂	Age ≥ 75 years	2
	Age 65-74 years	1
D	Diabetes	1
S₂	Prior Stroke or TIA	2
V	Vascular disease (including ischaemic heart disease and peripheral arterial disease)	1
S	Sex (female)	1

The table below shows a suggested anticoagulation strategy based on the score:

Score	Anticoagulation
-------	-----------------

0	No treatment
1	Males: Consider anticoagulation Females: No treatment
2 or more	Offer anticoagulation

Doctors have always thought carefully about the risk/benefit profile of starting someone on warfarin. A history of falls, old age, alcohol excess and a history of previous bleeding are common things that make us consider whether warfarinisation is in the best interests of the patient. NICE now recommend we formalise this risk assessment using the HASBLED scoring system.

	Risk factor	Points
H	Hypertension, uncontrolled, systolic BP > 160 mmHg	1
A	Abnormal renal function (dialysis or creatinine > 200) Or Abnormal liver function (cirrhosis, bilirubin > 2 times normal, ALT/AST/ALP > 3 times normal)	1 for any renal abnormalities 1 for any liver abnormalities
S	Stroke, history of	1
B	Bleeding, history of bleeding or tendency to bleed	1
L	Labile INRs (unstable/high INRs, time in therapeutic range < 60%)	1
E	Elderly (> 65 years)	1
D	Drugs Predisposing to Bleeding (Antiplatelet agents, NSAIDs) Or Alcohol Use (>8 drinks/week)	1 for drugs 1 for alcohol

Question 115 of 156

Next

A 62-year-old man who had a mechanical mitral valve replacement four years ago is reviewed. What long term antithrombotic therapy is he likely to be taking?

- ☐ A. Nothing
- ☐ B. Warfarin
- ☐ C. Aspirin
- ☐ D. Aspirin + clopidogrel for the first 12 months
- ☒ E. Warfarin + aspirin

Next question

Prosthetic heart valves - antithrombotic therapy:

- bioprosthetic: aspirin
- mechanical: warfarin + aspirin

Prosthetic heart valves

The most common valves which need replacing are the aortic and mitral valve. There are two main options for replacement: biological (bioprosthetic) or mechanical.

Biological (bioprosthetic) valves	Mechanical valves
Usually bovine or porcine in origin	The most common type now implanted is the bileaflet valve. Ball-and-cage valves are rarely used nowadays
Major disadvantage is structural deterioration and calcification over time. Most older patients (> 65 years for aortic valves and > 70 years for mitral valves) receive a bioprosthetic valve	Mechanical valves have a low failure rate
Long-term anticoagulation not usually needed. Warfarin	Major disadvantage is the increased risk of thrombosis meaning long-term anticoagulation is needed. Aspirin is normally given in addition unless there is a

may be given for the first 3 months depending on patient factors. Low-dose aspirin is given long-term.

contraindication.

Target INR


- aortic: 2.0-3.0
- mitral: 2.5-3.5

Following the 2008 NICE guidelines for prophylaxis of endocarditis antibiotics are no longer recommended for common procedures such as dental work.

Question 116 of 156

Next


An 82-year-old man is reviewed in the hypertension clinic. His blood pressure today is 144/86 mmHg which is consistent with recent readings. He has already had his annual bloods done which are as follows:

Na ⁺	141 mmol/l
K ⁺	4.1 mmol/l
Urea	7.2 mmol/l
Creatinine	95  mol/l
HbA1c	39 mmol/mol (5.7%)
Total cholesterol	4.3 mmol/l
HDL	1.0 mmol/l

His medications are as follows:

- ramipril 10mg od
- indapamide MR 1.5 mg od
- amlodipine 10mg od
- simvastatin 20mg on

Which one of the following changes, if any, should you discuss with the patient?

- ☐ A. Switch indapamide for furosemide 40mg od
- ☐ B. Start spironolactone 25mg od
- ☐ C. Increase the indapamide dose
-  ☒ D. No changes to the medication are indicated
- ☐ E. Add atenolol 50mg od

Next question

As this patient is > 80-years-old a clinic reading of < 150/90 mmHg is acceptable. No changes should therefore be made to his antihypertensives.

Hypertension: management

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ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

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- offer drug treatment regardless of age

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Step 1 treatment

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Step 2 treatment

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- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 117 of 156

Next

A 62-year-old man is reviewed the day after a successful elective DC cardioversion for atrial fibrillation. Six weeks ago he presented in fast atrial fibrillation. A decision was made at the time to warfarinise him for six weeks after which he was to be cardioverted. During this time he had a normal transthoracic echocardiogram. He has no past medical history of note other than treatment for a basal cell carcinoma. What is the most appropriate plan regarding anticoagulation?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Can stop immediately |
| <input type="radio"/> | B. Continue warfarinisation for 1 week then review following |
| <input type="radio"/> | C. Lifelong warfarin |
| <input type="radio"/> | D. Lifelong aspirin |
| <input checked="" type="radio"/> | E. Continue warfarinisation for 4 weeks then review |

Next question

Atrial fibrillation: cardioversion

Onset < 48 hours

If the atrial fibrillation (AF) is definitely of less than 48 hours onset patients should be heparinised. Patients who have risk factors for ischaemic stroke should be put on lifelong oral anticoagulation. Otherwise, patients may be cardioverted using either:

- electrical - 'DC cardioversion'

- pharmacology - amiodarone if structural heart disease, flecainide in those without structural heart disease

Following electrical cardioversion if AF is confirmed as being less than 48 hours duration then further anticoagulation is unnecessary

Onset > 48 hours

If the patient has been in AF for more than 48 hours then anticoagulation should be given for at least 3 weeks prior to cardioversion. An alternative strategy is to perform a transoesophageal echo (TOE) to exclude a left atrial appendage (LAA) thrombus. If excluded patients may be heparinised and cardioverted immediately.

If there is a high risk of cardioversion failure (e.g. Previous failure or AF recurrence) then it is recommend to have at least 4 weeks amiodarone or sotalol prior to electrical cardioversion

Following electrical cardioversion patients should be anticoagulated for at least 4 weeks. After this time decisions about anticoagulation should be taken on an individual basis depending on the risk of recurrence

Question 118 of 156

Next

Which one of the following side-effects is most associated with the use of verapamil?

- | | |
|----------------------------------|-------------------------|
| <input type="radio"/> | A. Dyspepsia |
| <input type="radio"/> | B. Myalgia |
| <input type="radio"/> | C. Gingival hyperplasia |
| <input checked="" type="radio"/> | D. Constipation |
| <input type="radio"/> | E. Ankle oedema |

Next question

All of the above side-effects may occur but constipation is the most common.

Calcium channel blockers

Calcium channel blockers are primarily used in the management of cardiovascular disease. Voltage-

gated calcium channels are present in myocardial cells, cells of the conduction system and those of the vascular smooth muscle. The various types of calcium channel blockers have varying effects on these three areas and it is therefore important to differentiate their uses and actions.

Examples	Indications & notes	Side-effects and cautions
Verapamil	Angina, hypertension, arrhythmias Highly negatively inotropic Should not be given with beta-blockers as may cause heart block	Heart failure, constipation, hypotension, bradycardia, flushing
Diltiazem	Angina, hypertension Less negatively inotropic than verapamil but caution should still be exercised when patients have heart failure or are taking beta-blockers	Hypotension, bradycardia, heart failure, ankle swelling
Nifedipine, amlodipine, felodipine (dihydropyridines)	Hypertension, angina, Raynaud's Affects the peripheral vascular smooth muscle more than the myocardium and therefore do not result in worsening of heart failure	Flushing, headache, ankle swelling

Question 119 of 156

Next

A 61-year-old woman who is normally fit and well is admitted with chest pain. An ECG shows anterolateral T wave inversion. The troponin I value at 12 hours is 245 ng/L (reference range < 50 ng/L). On discharge her medications include aspirin, atorvastatin, bisoprolol and ramipril. Which one of the following statements best describes the role of clopidogrel in this situation?

- ☐ A. Is only given if aspirin is contraindicated
- ☐ B. Should be prescribed for life for patients < 65 years old
- ☒ C. Should be prescribed for the next 12 months for all patients
- ☐ D. Should be prescribed for life for all patients



E. Should be prescribed for the next 12 months for patients who have a 12 month mortality risk of greater than 5%

Next question

NICE NSTEMI/unstable angina guidelines are based on 6 month mortality risk:

- if > 1.5% clopidogrel for 12 months
- if > 3% angiography within 96 hours

The 2013 NICE guidelines on secondary prevention of myocardial infarction superseded the 2010 NICE unstable angina and NSTEMI guidelines - risk scores are no longer used to determine whether clopidogrel is given.

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

Question 120 of 156

Next

You review a 69-year-old man who is known to have angina and heart failure. His current medications include aspirin, simvastatin, bisoprolol, glyceryl trinitrate, ramipril and frusemide. Despite his current medications he is still having frequent angina attacks when he exerts himself. You decide to add a calcium channel blocker. Which one of the following is it most appropriate to add?

- ✓ ☒ A. Felodipine
- ☐ B. Diltiazem
- ☐ C. Nimodipine
- ☐ D. Lacidipine
- ☐ E. Verapamil

Next question

Verapamil and diltiazem should be avoided given his history of heart failure. Nimodipine and lacidipine are neither licensed nor used in patients with angina.

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'
- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine


- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity

- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

Question 121 of 156

Next

What is the most appropriate time to take blood samples for therapeutic monitoring of digoxin levels?

- ☐ A. At any time
-  ☒ B. At least 6 hours after last dose
- ☐ C. At least 2 hours after last dose
- ☐ D. Immediately after last dose
- ☐ E. At least 4 hours after last dose

Next question

Therapeutic drug monitoring

Lithium

- range = 0.4 - 1.0 mmol/l
- take 12 hrs post-dose

Ciclosporin

- trough levels immediately before dose

Digoxin

- at least 6 hrs post-dose

Phenytoin

- trough levels immediately before dose

Question 122 of 156

Next

A 75-year-old woman is brought to the surgery by her family. She has been getting more short-of-breath over the last 6 weeks and says her energy levels are low. An ECG shows atrial fibrillation at a rate of 114 / min. Blood pressure is 128/80 mmHg and a chest x-ray is unremarkable. What is the appropriate drug to control the heart rate?

- | | |
|----------------------------------|---------------|
| <input type="radio"/> | A. Felodipine |
| <input type="radio"/> | B. Amiodarone |
| <input type="radio"/> | C. Digoxin |
| <input type="radio"/> | D. Flecainide |
| <input checked="" type="radio"/> | E. Bisoprolol |

Next question

Atrial fibrillation: rate control - beta blockers preferable to digoxin

This question reiterates an important point which frequently comes up in exams - digoxin is no longer first-line for rate control in atrial fibrillation. Her shortness-of-breath is likely to be rate related and does not necessarily mean that she is in heart failure. This is supported by a normal chest x-ray.

Please see the NICE guidelines for further information.

Atrial fibrillation: rate control and maintenance of sinus rhythm

The Royal College of Physicians and NICE published guidelines on the management of atrial fibrillation (AF) in 2006. The following is also based on the joint American Heart Association (AHA), American College of Cardiology (ACC) and European Society of Cardiology (ESC) 2012 guidelines

Agents used to control rate in patients with atrial fibrillation

- beta-blockers
- calcium channel blockers
- digoxin (not considered first-line anymore as they are less effective at controlling the heart rate during exercise. However, they are the preferred choice if the patient has coexistent heart failure)

Agents used to maintain sinus rhythm in patients with a history of atrial fibrillation

- sotalol
- amiodarone
- flecainide
- others (less commonly used in UK): disopyramide, dofetilide, procainamide, propafenone, quinidine

The table below indicates some of the factors which may be considered when considering either a rate control or rhythm control strategy

Factors favouring rate control	Factors favouring rhythm control
Older than 65 years History of ischaemic heart disease	Younger than 65 years Symptomatic First presentation Lone AF or AF secondary to a corrected precipitant (e.g. Alcohol) Congestive heart failure

Question 123 of 156

Next

A 66-year-old man attends his local GP surgery. He is awaiting having an inguinal hernia repaired but was told to attend surgery by the pre-operative clinic as his blood pressure was recorded at 182/112 mmHg. He has no significant past medical history of note other than the hernia and has not had a blood pressure check for over 10 years. A clinic blood pressure reading today is 190/114 mmHg. He reports no headaches or other symptoms. Fundoscopy is unremarkable and there is no postural drop. What is the most appropriate action?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Arrange 3 blood pressure checks with the practice nurse over the next 2 weeks with medical review following |
| <input type="radio"/> | B. Admit to hospital |
| <input checked="" type="radio"/> | C. Start amlodipine |
| <input type="radio"/> | D. Arrange ambulatory blood pressure monitoring |
| <input type="radio"/> | E. Arrange an urgent cardiology out-patient appointment |

Next question

Hypertension - consider immediate treatment if $\geq 180/110$ mmHg

NICE recommend considering immediate treatment if the clinic blood pressure reading is $\geq 180/110$ mmHg. It would be appropriate to treat in this situation given that this is the second reading which is very high.

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a

more accurate assessment of a patients' overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraavalvular aortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered

- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if $<$ 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 124 of 156

Next

A 60-year-old man who is investigated for exertional chest pain is diagnosed as having angina pectoris. Which one of the following drugs is most likely to improve his long-term prognosis?

- ☐ A. Atenolol
- ✓ ☒ B. Aspirin
- ☐ C. Isosorbide mononitrate
- ☐ D. Ramipril
- ☐ E. Nicorandil

Next question

Strong evidence exists supporting the use of aspirin in stable angina. The benefit of ACE inhibitors and beta-blockers are significant in patients who've had a myocardial infarction but modest in those with stable angina. Please see the CKS link for a review of the most recent trials.

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'
- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)

- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

Question 125 of 156

Next

You are doing a medication review on a 79-year-old man. His current medications include aspirin, verapamil, allopurinol and co-codamol. Which one of the following is it most important to avoid prescribing concurrently?

- | | |
|-----------------------|----------------|
| <input type="radio"/> | A. Colchicine |
| <input type="radio"/> | B. Digoxin |
| <input type="radio"/> | C. Simvastatin |

☐ D. Tramadol

✓ ☒ E. Atenolol

Next question

Beta-blockers combined with verapamil can potentially cause profound bradycardia and asystole.

Beta-blockers

Beta-blockers are an important class of drug used mainly in the management of cardiovascular disorders.

Indications

- angina
- post-myocardial infarction
- heart failure: beta-blockers were previously avoided in heart failure but there is now strong evidence that certain beta-blockers improve both symptoms and mortality
- arrhythmias: beta-blockers have now replaced digoxin as the rate-control drug of choice in atrial fibrillation
- hypertension: the role of beta-blockers has diminished in recent years due to a lack of evidence in terms of reducing stroke and myocardial infarction.
- thyrotoxicosis
- migraine prophylaxis
- anxiety

Examples

- atenolol
- propranolol: one of the first beta-blockers to be developed. Lipid soluble therefore crosses the blood-brain barrier

Side-effects

- bronchospasm
- cold peripheries
- fatigue
- sleep disturbances, including nightmares

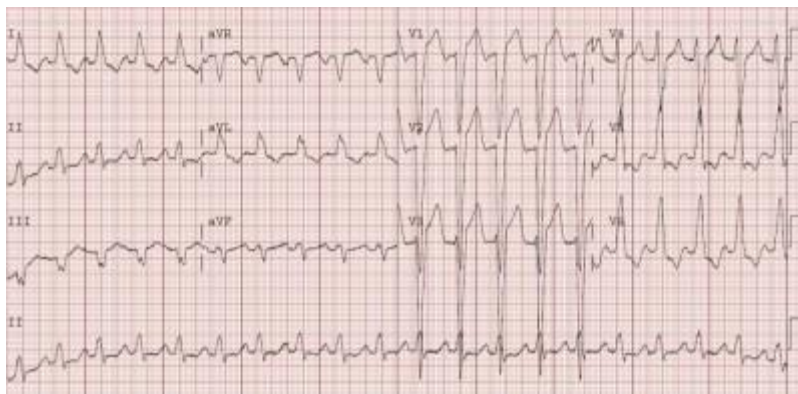
Contraindications

- uncontrolled heart failure
- asthma
- sick sinus syndrome
- concurrent verapamil use: may precipitate severe bradycardia

Question 126 of 156

Next

A 58-year-old man presents to surgery with intermittent chest pains for the past two days. Whilst you are taking the history he complains of worsening pain and you arrange an ECG immediately:



© Image used on license from [Dr Smith, University of Minnesota](#)



He is tachycardic and sweaty with a blood pressure of 128/88mmHg. What does the ECG show?

- | | |
|----------------------------------|-------------------------------|
| <input type="radio"/> | A. Narrow complex tachycardia |
| <input type="radio"/> | B. Right bundle branch block |
| <input checked="" type="radio"/> | C. Left bundle branch block |
| <input type="radio"/> | D. Ventricular tachycardia |



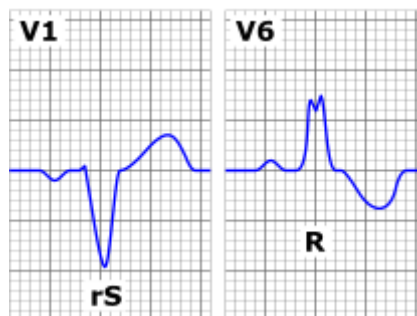
E. Posterior myocardial infarction

Next question

The ECG shows left bundle branch block. This is important in the context of chest pain as it may be an indication for thrombolysis or percutaneous coronary intervention. The most appropriate management is clearly to admit via a blue light ambulance.

ECG: left bundle branch block

The diagram below shows the typical features of left bundle branch block (LBBB):



One of the most common ways to remember the difference between LBBB and RBBB is WiLLiaM MaRRoW

- in LBBB there is a 'W' in V1 and a 'M' in V6
- in RBBB there is a 'M' in V1 and a 'W' in V6



© Image used on license from [Dr Smith, University of Minnesota](#)



ECG showing typical features of LBBB

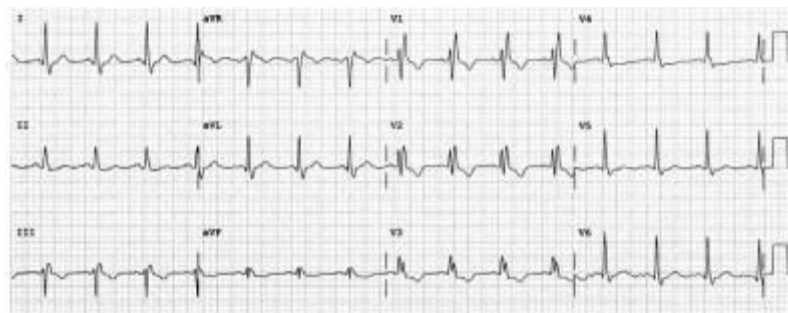
Causes of LBBB

- ischaemic heart disease
- hypertension
- aortic stenosis
- cardiomyopathy
- rare: idiopathic fibrosis, digoxin toxicity, hyperkalaemia

Question 127 of 156

Next

A 74-year-old woman has an ECG as part of a hypertension work-up after being found to have a reading of 162/102 mmHg. There is no past medical history of note other than having a thyroid cancer successfully operated on 20 years ago. She is currently asymptomatic and clinical examination (apart from the raised blood pressure) is unremarkable. The ECG is shown below:



© Image used on license from [Dr Smith, University of Minnesota](#)



You plan to start her on amlodipine 5mg od. What is the most appropriate further management given the ECG?



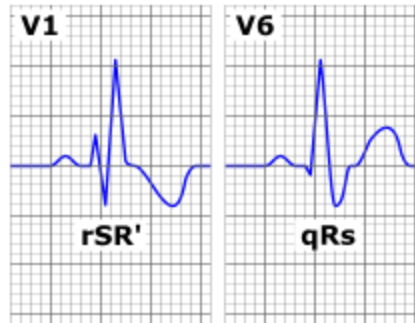
- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. No further action required |
| <input type="radio"/> | B. Arrange a B-type natriuretic peptide (BNP) test |
| <input type="radio"/> | C. Arrange an echocardiogram |
| <input type="radio"/> | D. Refer for an exercise tolerance test |
| <input type="radio"/> | E. Arrange a 24 hour tape |

[Next question](#)

Right bundle branch blocker may be a normal variant, especially in older patients. Given the absence of other symptoms or signs no further investigation is warranted.

ECG: right bundle branch block

Right bundle branch block is a common feature seen on ECGs.



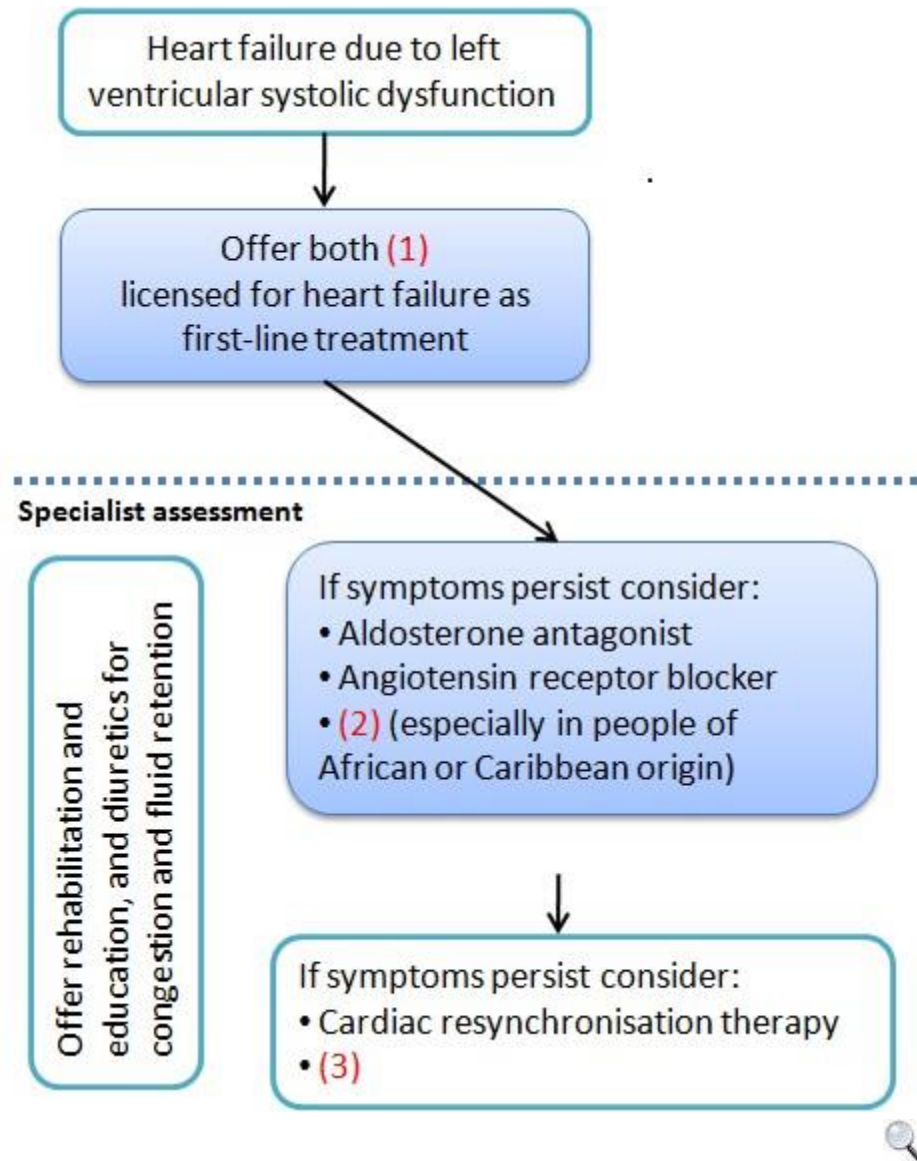
One of the most common ways to remember the difference between LBBB and RBBB is WiLLiaM MaRRoW

- in LBBB there is a 'W' in V1 and a 'M' in V6
- in RBBB there is a 'M' in V1 and a 'W' in V6

Causes of RBBB

- normal variant - more common with increasing age
- right ventricular hypertrophy
- chronically increased right ventricular pressure - e.g. cor pulmonale
- pulmonary embolism
- myocardial infarction
- atrial septal defect
- cardiomyopathy or myocarditis

Theme: NICE heart failure guidelines



- A. Loop diuretic
- B. Implantable cardioverter defibrillator
- C. Cardiac resynchronisation therapy
- D. Aldosterone antagonist

- E. Angiotensin receptor blocker
- F. Hydralazine + nitrate
- G. ACE-inhibitor + beta-blocker
- H. ACE-inhibitor + frusemide
- I. Calcium channel blocker
- J. Digoxin

The diagram below is taken from the NICE guidelines on the management of heart failure:

128. Gap (1)

The correct answer is ACE-inhibitor + beta-blocker

129. Gap (2)

The correct answer is Hydralazine + nitrate

130. Gap (3)

The correct answer is Digoxin

[Next question](#)

Heart failure: drug management

A number of drugs have been shown to improve mortality in patients with chronic heart failure:

- ACE inhibitors (SAVE, SOLVD, CONSENSUS)
- spironolactone (RALES)
- beta-blockers (CIBIS)

- hydralazine with nitrates (VHEFT-1)

No long-term reduction in mortality has been demonstrated for loop diuretics such as furosemide.

NICE issued updated guidelines on management in 2010, key points include:

- first-line treatment for all patients is both an ACE-inhibitor and a beta-blocker
- second-line treatment is now either an aldosterone antagonist, angiotensin II receptor blocker or a hydralazine in combination with a nitrate
- if symptoms persist cardiac resynchronisation therapy or digoxin* should be considered
- diuretics should be given for fluid overload
- offer annual influenza vaccine
- offer one-off** pneumococcal vaccine

*digoxin has also not been proven to reduce mortality in patients with heart failure. It may however improve symptoms due to its inotropic properties. Digoxin is strongly indicated if there is coexistent atrial fibrillation

**adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years

Question 131 of 156

Next

A 42-year-old man of Afro-Caribbean origin is diagnosed as having hypertension. Secondary causes of hypertension have been excluded. What is the most appropriate initial drug therapy?

- | | |
|----------------------------------|----------------|
| <input type="radio"/> | A. Losartan |
| <input type="radio"/> | B. Bisoprolol |
| <input type="radio"/> | C. Doxazosin |
| <input type="radio"/> | D. Perindopril |
| <input checked="" type="radio"/> | E. Amlodipine |

ACE inhibitors have reduced efficacy in black patients and are therefore not used first-line.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg

- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 132 of 156

Next

A 51-year-old man presents four weeks after being discharged from hospital. He had been admitted with chest pain and thrombolysed for a myocardial infarction. This morning he developed marked tongue and facial swelling. Which one of the following drugs is most likely to be responsible?

- ☐ A. Atorvastatin
- ☐ B. Isosorbide mononitrate
- ☐ C. Atenolol
- ☐ D. Aspirin
- ☒ E. Ramipril

Next question

ACE inhibitors are the most common cause of drug-induced angioedema.

Angiotensin-converting enzyme inhibitors

Angiotensin-converting enzyme (ACE) inhibitors are now the established first-line treatment in younger patients with hypertension and are also extensively used to treat heart failure. They are known to be less effective in treating hypertensive Afro-Caribbean patients. ACE inhibitors are also used to treat diabetic nephropathy and have a role in secondary prevention of ischaemic heart disease.

Mechanism of action:

- inhibit the conversion angiotensin I to angiotensin II

Side-effects:

- cough: occurs in around 15% of patients and may occur up to a year after starting treatment. Thought to be due to increased bradykinin levels
- angioedema: may occur up to a year after starting treatment
- hyperkalaemia
- first-dose hypotension: more common in patients taking diuretics

Cautions and contraindications

- pregnancy and breastfeeding - avoid
- renovascular disease - significant renal impairment may occur in patients who have undiagnosed bilateral renal artery stenosis
- aortic stenosis - may result in hypotension
- patients receiving high-dose diuretic therapy (more than 80 mg of furosemide a day) - significantly increases the risk of hypotension
- hereditary of idiopathic angioedema

Monitoring

- urea and electrolytes should be checked before treatment is initiated and after increasing the dose
- a rise in the creatinine and potassium may be expected after starting ACE inhibitors. Acceptable changes are an increase in serum creatinine, up to 30%* from baseline and an increase in potassium up to 5.5 mmol/l*.

*Renal Association UK, Clinical Knowledge Summaries quote 50% which seems rather high. SIGN advise that the fall in eGFR should be less than 20%. The NICE CKD guidelines suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable

Question 133 of 156

Next

Which one of the following statements regarding the diagnosis of hypertension is true?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Home blood pressure monitoring is superior and should be offered in preference to ambulatory blood pressure monitoring |
| <input type="radio"/> | B. Home blood pressure monitoring should be performed twice a day for at least 4 weeks |
| <input type="radio"/> | C. Stage 2 hypertension is defined by clinic readings $\geq 140/90$ mmHg |
| <input type="radio"/> | D. A one-off blood pressure reading of 148/88 mmHg in an otherwise well 74-year-old can be ignored |
| <input checked="" type="radio"/> | E. When assessing home blood pressure monitoring the first day readings should be discarded |

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supraaortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a pheochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated

- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

Question 134 of 156

Next

A 34-year-old man presents to your morning clinic with a two day history of chest pain. The pain is worse on coughing and taking a deep breath in. Since this morning it has been constant and is present when you review him. He feels slightly short-of-breath. His oxygen saturations are 99% on room air, pulse is 72/min, blood pressure is 130/84 mmHg and auscultation of the cardiorespiratory system is unremarkable. The practice nurse performs an ECG:



© Image used on license from [Dr Smith, University of Minnesota](#)



What is the most likely diagnosis?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Pulmonary embolism |
| <input type="radio"/> | B. Normal ECG with 'high take-off' ST segments |
| <input type="radio"/> | C. Aortic dissection |
| <input type="radio"/> | D. Aortic stenosis |
| <input checked="" type="radio"/> | E. Myocardial infarction |

Next question

The ECG shows Q-waves, ST elevation, and hyperacute T-waves in V2 and V3, diagnostic of myocardial infarction. This patient was later shown to have a left anterior descending (LAD) occlusion.

The history is clearly not typical. He is young and has a short history of pleuritic pain. Unfortunately, as experience tells us, patients don't read textbooks and atypical presentations are very common. As the ECG findings are suggestive of a ST elevation myocardial infarction he requires immediate admission.

ECG: myocardial ischaemia

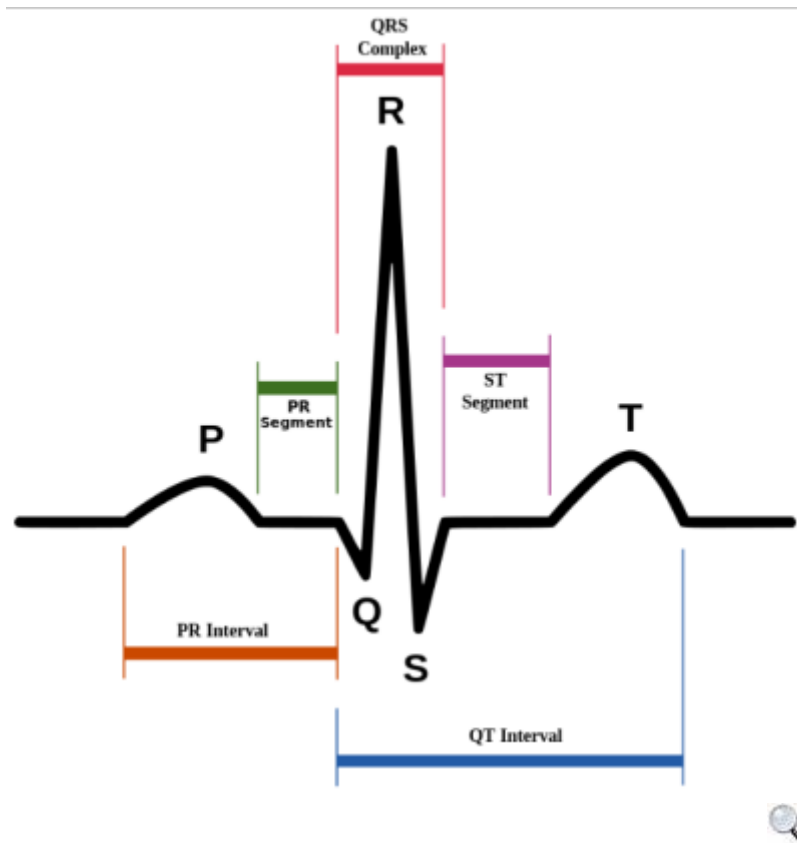
One of the main uses of the ECG is to determine whether a patient is having a cardiac event in the context of chest pain. A wide variety of changes can be seen depending on what type of ischaemic event is happening, where it is happening and when it happened.

Acute myocardial infarction (MI)

- hyperacute T waves are often the first sign of MI but often only persists for a few minutes
- ST elevation may then develop
- the T waves typically become inverted within the first 24 hours. The inversion of the T waves can last for days to months
- pathological Q waves develop after several hours to days. This change usually persists indefinitely

Definition of ST elevation*

- new ST elevation at the J-point in two contiguous leads with the cut-off points: ≥ 0.2 mV in men or ≥ 0.15 mV in women in leads V2-V3 and/or ≥ 0.1 mV in other leads



*Thygesen K et al. Universal definition of myocardial infarction. Circulation 2007 Nov 27; 116(22) 2634-53. doi:10.1161/CIRCULATIONAHA.107.187397 pmid:17951284

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Next

You are evaluating a patient with suspected orthostatic syncope. What change in blood pressure upon standing for 3 minutes would be considered diagnostic for postural hypotension?



A. Symptomatic or asymptomatic fall in systolic BP > 30 mmHg or diastolic BP > 20 mmHg

- | | | |
|----------------------------------|----|---|
| <input type="radio"/> | B. | Symptomatic fall in systolic BP > 30 mmHg or diastolic BP > 20 mmHg |
| <input type="radio"/> | C. | Symptomatic or asymptomatic fall in systolic BP > 30 mmHg or diastolic BP > 10 mmHg |
| <input checked="" type="radio"/> | D. | Symptomatic fall in systolic BP > 20 mmHg or diastolic BP > 10 mmHg |
| <input type="radio"/> | E. | Symptomatic or asymptomatic fall in systolic BP > 20 mmHg or diastolic BP > 10 mmHg |

Next question

Syncope

Syncope may be defined as a transient loss of consciousness due to global cerebral hypoperfusion with rapid onset, short duration and spontaneous complete recovery. Note how this definition excludes other causes of collapse such as epilepsy.

The European Society of Cardiology published guidelines in 2009 on the investigation and management of syncope. They suggested the following classification:

Reflex syncope (neurally mediated)

- vasovagal: triggered by emotion, pain or stress. Often referred to as 'fainting'
- situational: cough, micturition, gastrointestinal
- carotid sinus syncope

Orthostatic syncope

- primary autonomic failure: Parkinson's disease, Lewy body dementia
- secondary autonomic failure: e.g. Diabetic neuropathy, amyloidosis, uraemia
- drug-induced: diuretics, alcohol, vasodilators
- volume depletion: haemorrhage, diarrhoea

Cardiac syncope

- arrhythmias: bradycardias (sinus node dysfunction, AV conduction disorders) or tachycardias (supraventricular, ventricular)

- structural: valvular, myocardial infarction, hypertrophic obstructive cardiomyopathy
- others: pulmonary embolism

Reflex syncope is the most common cause in all age groups although orthostatic and cardiac causes become progressively more common in older patients.

Evaluation

- cardiovascular examination
- postural blood pressure readings: a symptomatic fall in systolic BP > 20 mmHg or diastolic BP > 10 mmHg or decrease in systolic BP < 90 mmHg is considered diagnostic
- ECG
- carotid sinus massage
- tilt table test
- 24 hour ECG

Question 136-138 of 156

Next

Theme: Chest pain: assessment of patients with suspected cardiac chest pain

- | | |
|-----------|---|
| A. | No further tests, treat as angina |
| B. | Coronary angiography |
| C. | Trial of GTN spray |
| D. | Functional imaging e.g. Myocardial perfusion scan |
| E. | CT calcium scoring |
| F. | Exercise tolerance test |
| G. | Echocardiogram (resting) |

For each scenario please select the most appropriate diagnostic strategy:

136. A 55-year-old man complains of chest tightness whilst doing the gardening.

You calculate his estimated likelihood of having coronary artery disease to be 50%.

The correct answer is Functional imaging e.g. Myocardial perfusion scan

- 137.** A 35-year-old woman who has type 1 diabetes mellitus describes 'heavy sensations' in her chest when she is stressed.

You calculate her estimated likelihood of having coronary artery disease to be 20%.

The correct answer is CT calcium scoring

- 138.** A 60-year-old woman presents with exertional chest pain.

You calculate her estimated likelihood of having coronary artery disease to be 70%.

The correct answer is Coronary angiography

Next question

Chest pain: assessment of patients with suspected cardiac chest pain

NICE issued guidelines in 2010 on the 'Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin'.

Below is a brief summary of the key points. Please see the link for more details.

Patients presenting with acute chest pain

Immediate management of suspected acute coronary syndrome (ACS)

- glyceryl trinitrate

- aspirin 300mg. NICE do not recommend giving other antiplatelet agents (i.e. Clopidogrel) outside of hospital
- do not routinely give oxygen, only give if sats < 94%*
- perform an ECG as soon as possible but do not delay transfer to hospital. A normal ECG does not exclude ACS

Referral

- current chest pain or chest pain in the last 12 hours with an abnormal ECG: emergency admission
- chest pain 12-72 hours ago: refer to hospital the same-day for assessment
- chest pain > 72 hours ago: perform full assessment with ECG and troponin measurement before deciding upon further action

*NICE suggest the following in terms of oxygen therapy:

- do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:
- people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94-98%
- people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88-92% until blood gas analysis is available.

Patients presenting with stable chest pain

With all due respect to NICE the guidelines for assessment of patients with stable chest pain are rather complicated. They suggest an approach where the risk of a patient having coronary artery disease (CAD) is calculated based on their symptoms (whether they have typical angina, atypical angina or non-anginal chest pain), age, gender and risk factors.

NICE define anginal pain as the following:

- 1. constricting discomfort in the front of the chest, neck, shoulders, jaw or arms
- 2. precipitated by physical exertion
- 3. relieved by rest or GTN in about 5 minutes
- patients with all 3 features have typical angina
- patients with 2 of the above features have atypical angina
- patients with 1 or none of the above features have non-anginal chest pain

The risk tables are not reproduced here but can be found by clicking on the link.

If patients have typical anginal symptoms and a risk of CAD is greater than 90% then no further diagnostic testing is required. It should be noted that all men over the age of 70 years who have typical anginal symptoms fall into this category.

For patients with an estimated risk of 10-90% the following investigations are recommended. Note the absence of the exercise tolerance test:

Estimated likelihood of CAD	Diagnostic testing
61-90%	Coronary angiography
30-60%	Functional imaging, for example: <ul style="list-style-type: none">• myocardial perfusion scan with SPECT• stress echocardiography• first-pass contrast-enhanced magnetic resonance (MR) perfusion• MR imaging for stress-induced wall motion abnormalities.
10-29%	CT calcium scoring

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Next

Which one of the following would not be considered a normal variant on the ECG of an athletic 28-year-old man?

- ☐ A. Wenckebach phenomenon
- ☐ B. Sinus bradycardia
- ☐ C. Junctional rhythm
- ☐ D. First degree heart block
- ☒ E. Left bundle branch block

Next question

ECG: normal variants

The following ECG changes are considered normal variants in an athlete:

- sinus bradycardia
- junctional rhythm
- first degree heart block
- Wenckebach phenomenon

Question 140 of 156

Next

You are considering prescribing an antibiotic to a 28-year-old man who tells you he has Long QT syndrome. Which antibiotic is it most important to avoid?

- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. Doxycycline |
| <input type="radio"/> | B. Trimethoprim |
| <input checked="" type="radio"/> | C. Erythromycin |
| <input type="radio"/> | D. Rifampicin |
| <input type="radio"/> | E. Co-amoxiclav |

Next question

Long QT syndrome

Long QT syndrome (LQTS) is an inherited condition associated with delayed repolarization of the ventricles. It is important to recognise as it may lead to ventricular tachycardia and can therefore cause collapse/sudden death. The most common variants of LQTS (LQT1 & LQT2) are caused by defects in the alpha subunit of the slow delayed rectifier potassium channel. A normal corrected QT

interval is less than 430 ms in males and 450 ms in females.

Causes of a prolonged QT interval:

Congenital	Drugs*	Other
<ul style="list-style-type: none">• Jervell-Lange-Nielsen syndrome (includes deafness and is due to an abnormal potassium channel)• Romano-Ward syndrome (no deafness)	<ul style="list-style-type: none">• amiodarone, sotalol, class 1a antiarrhythmic drugs• tricyclic antidepressants, selective serotonin reuptake inhibitors (especially citalopram)• methadone• chloroquine• terfenadine**• erythromycin• haloperidol	<ul style="list-style-type: none">• electrolyte: hypocalcaemia, hypokalaemia, hypomagnesaemia• acute myocardial infarction• myocarditis• hypothermia• subarachnoid haemorrhage

Features

- may be picked up on routine ECG or following family screening
- Long QT1 - usually associated with exertional syncope, often swimming
- Long QT2 - often associated with syncope occurring following emotional stress, exercise or auditory stimuli
- Long QT3 - events often occur at night or at rest
- sudden cardiac death

Management

- avoid drugs which prolong the QT interval and other precipitants if appropriate (e.g. Strenuous exercise)
- beta-blockers***
- implantable cardioverter defibrillators in high risk cases

*the usual mechanism by which drugs prolong the QT interval is blockage of potassium channels. See the link for more details

**a non-sedating antihistamine and classic cause of prolonged QT in a patient, especially if also taking P450 enzyme inhibitor, e.g. Patient with a cold takes terfenadine and erythromycin at the same time

***note sotalol may exacerbate long QT syndrome

Question 141 of 156

Next

You are considering prescribing sildenafil to a patient who complains of erectile dysfunction. He had a myocardial infarction earlier in the year but is not currently taking nitrates or nicorandil. How long do NICE recommend we wait following a myocardial infarction before prescribing a phosphodiesterase type 5 inhibitor?

- | | |
|----------------------------------|-------------------------------|
| <input type="radio"/> | A. Can prescribe straightaway |
| <input type="radio"/> | B. 1 week |
| <input type="radio"/> | C. 4 weeks |
| <input type="radio"/> | D. 3 months |
| <input checked="" type="radio"/> | E. 6 months |

Next question

Myocardial infarction: secondary prevention

NICE produced guidelines on the management of patients following a myocardial infarction (MI) in 2013. Some key points are listed below

All patients should be offered the following drugs:

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- ACE inhibitor
- beta-blocker
- statin

Some selected lifestyle points:

- diet: advise a Mediterranean style diet, switch butter and cheese for plant oil based products. Do not recommend omega-3 supplements or eating oily fish
- exercise: advise 20-30 mins a day until patients are 'slightly breathless'
- sexual activity may resume 4 weeks after an uncomplicated MI. Reassure patients that sex does not increase their likelihood of a further MI. PDE5 inhibitors (e.g, sildenafil) may be used 6 months after a MI. They should however be avoided in patient prescribed either nitrates or nicorandil

Clopidogrel

- since clopidogrel came off patent it is now much more widely used post-MI
- STEMI: the European Society of Cardiology recommend dual antiplatelets for 12 months. In the UK this means aspirin + clopidogrel
- non-ST segment elevation myocardial infarction (NSTEMI): following the NICE 2013 *Secondary prevention in primary and secondary care for patients following a myocardial infarction* guidelines clopidogrel should be given for the first 12 months

Aldosterone antagonists

- patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment (e.g. eplerenone) should be initiated within 3-14 days of the MI, preferably after ACE inhibitor therapy

Question 142 of 156

Next

An 83-year-old woman is reviewed in the hypertension clinic. What should her target blood pressure be once on treatment?

<input type="radio"/>	A. 140/80 mmHg
<input type="radio"/>	B. 140/90 mmHg
<input type="radio"/>	C. 130/80 mmHg
<input type="radio"/>	D. 140/85 mmHg
<input checked="" type="radio"/>	E. 150/90 mmHg

Blood pressure target (based on clinic readings) for patients > 80 years - 150/90 mmHg

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that

lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg

- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Which one of the following agents is most useful in the maintenance of sinus rhythm in patients with atrial fibrillation?

- | | |
|----------------------------------|---------------|
| <input type="radio"/> | A. Verapamil |
| <input type="radio"/> | B. Diltiazem |
| <input type="radio"/> | C. Ibutilide |
| <input checked="" type="radio"/> | D. Amiodarone |
| <input type="radio"/> | E. Digoxin |

Next question

Atrial fibrillation: rate control and maintenance of sinus rhythm

The Royal College of Physicians and NICE published guidelines on the management of atrial fibrillation (AF) in 2006. The following is also based on the joint American Heart Association (AHA), American College of Cardiology (ACC) and European Society of Cardiology (ESC) 2012 guidelines

Agents used to control rate in patients with atrial fibrillation

- beta-blockers
- calcium channel blockers
- digoxin (not considered first-line anymore as they are less effective at controlling the heart rate during exercise. However, they are the preferred choice if the patient has coexistent heart failure)

Agents used to maintain sinus rhythm in patients with a history of atrial fibrillation

- sotalol
- amiodarone
- flecainide
- others (less commonly used in UK): disopyramide, dofetilide, procainamide, propafenone, quinidine

The table below indicates some of the factors which may be considered when considering either a rate control or rhythm control strategy

Factors favouring rate control	Factors favouring rhythm control
Older than 65 years History of ischaemic heart disease	Younger than 65 years Symptomatic First presentation Lone AF or AF secondary to a corrected precipitant (e.g. Alcohol) Congestive heart failure

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Next

The ECG below is taken from a 78-year-old woman who had been experiencing palpitations for the past two days. On review in surgery she is tachycardic but her blood pressure is 124/80 mmHg and there are no signs of hypertension.



© Image used on license from [Dr Smith, University of Minnesota](#)



What is the shown on the ECG?

- ☐ A. Sick sinus syndrome
- ☒ B. Atrial flutter with variable block
- ☐ C. Polymorphic ventricular tachycardia

- | | |
|-----------------------|--|
| <input type="radio"/> | D. Supraventricular tachycardia |
| <input type="radio"/> | E. Monomorphic ventricular tachycardia |

[Next question](#)

Whilst 'sawtooth' waves are seen the rhythm is irregular suggesting a diagnosis of atrial flutter with variable block.

Atrial flutter

Atrial flutter is a form of supraventricular tachycardia characterised by a succession of rapid atrial depolarisation waves.

ECG findings

- 'sawtooth' appearance
- as the underlying atrial rate is often around 300/min the ventricular or heart rate is dependent on the degree of AV block. For example if there is 2:1 block the ventricular rate will be 150/min
- flutter waves may be visible following carotid sinus massage or adenosine

Management

- is similar to that of atrial fibrillation although medication may be less effective
- atrial flutter is more sensitive to cardioversion however so lower energy levels may be used
- radiofrequency ablation of the tricuspid valve isthmus is curative for most patients

Question 145 of 156

[Next](#)

You review a 67-year-old woman who has a history of chronic obstructive pulmonary disease and hypertension. She has developed cor pulmonale and her current medications include frusemide 80 mg bd, amlodipine 10mg od and atenolol 50 mg od. You want to initiate an ACE inhibitor. What is the most appropriate action?

- | | |
|-----------------------|--|
| <input type="radio"/> | A. Stop frusemide for 2 days + start ramipril 1.25 mg od + check U&Es in 2 weeks |
|-----------------------|--|

- | | |
|----------------------------------|--|
| <input type="radio"/> | B. Start ramipril 1.25 mg od + check U&Es in 2 weeks |
| <input checked="" type="radio"/> | C. Refer to secondary care |
| <input type="radio"/> | D. Reduce frusemide to 80mg od + start ramipril 1.25 mg od + check U&Es in 2 weeks |
| <input type="radio"/> | E. Start ramipril 1.25 mg od + check U&Es in 5 days |

Next question

Both the BNF and Clinical Knowledge Summaries recommend referring people on larger doses of diuretics to specialists for initiation of ACE inhibitors.

Angiotensin-converting enzyme inhibitors

Angiotensin-converting enzyme (ACE) inhibitors are now the established first-line treatment in younger patients with hypertension and are also extensively used to treat heart failure. They are known to be less effective in treating hypertensive Afro-Caribbean patients. ACE inhibitors are also used to treat diabetic nephropathy and have a role in secondary prevention of ischaemic heart disease.

Mechanism of action:

- inhibit the conversion angiotensin I to angiotensin II

Side-effects:

- cough: occurs in around 15% of patients and may occur up to a year after starting treatment. Thought to be due to increased bradykinin levels
- angioedema: may occur up to a year after starting treatment
- hyperkalaemia
- first-dose hypotension: more common in patients taking diuretics

Cautions and contraindications

- pregnancy and breastfeeding - avoid
- renovascular disease - significant renal impairment may occur in patients who have undiagnosed bilateral renal artery stenosis
- aortic stenosis - may result in hypotension

- patients receiving high-dose diuretic therapy (more than 80 mg of furosemide a day) - significantly increases the risk of hypotension
- hereditary of idiopathic angioedema

Monitoring


- urea and electrolytes should be checked before treatment is initiated and after increasing the dose
- a rise in the creatinine and potassium may be expected after starting ACE inhibitors. Acceptable changes are an increase in serum creatinine, up to 30%* from baseline and an increase in potassium up to 5.5 mmol/l*.

*Renal Association UK, Clinical Knowledge Summaries quote 50% which seems rather high. SIGN advise that the fall in eGFR should be less than 20%. The NICE CKD guidelines suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable

Question 146 of 156

Next

A 70-year-old man is reviewed in the hypertension clinic. His blood pressure today is 146/92 mmHg which is consistent with recent readings. He has already had his annual bloods done which are as follows:

Na ⁺	141 mmol/l
K ⁺	4.7 mmol/l
Urea	6.1 mmol/l
Creatinine	91  mol/l
HbA1c	39 mmol/mol (5.7%)
Total cholesterol	4.1 mmol/l
HDL	1.2 mmol/l

His medications are as follows:

- ramipril 10mg od
- indapamide (standard release) 2.5 mg od
- amlodipine 10mg od

- atorvastatin 10mg on

Which one of the following changes should you discuss with the patient?

<input type="radio"/>	A. Add spironolactone 25mg od
<input type="radio"/>	B. Add atenolol 50mg od
<input type="radio"/>	C. Add doxazosin 1mg od
<input type="radio"/>	D. Increase the dose of atorvastatin
<input checked="" type="radio"/>	E. Increase the dose of indapamide

Next question

This patient's hypertension is not adequately controlled at the moment. Remember that the target clinic blood pressure for a patient < 80 years old is < 140/90 mmHg.

He is on step 4 of the NICE hypertension treatment plan. As the potassium is more than 4.5 mmol/l the thiazide dose should be increased. If the potassium was less than 4.5 mmol/l spironolactone would have been a better choice.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
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Stage	Criteria
Stage 1 hypertension	Clinic BP $\geq 140/90$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 135/85$ mmHg
Stage 2 hypertension	Clinic BP $\geq 160/100$ mmHg and subsequent ABPM daytime average or HBPM average BP $\geq 150/95$ mmHg
Severe hypertension	Clinic systolic BP ≥ 180 mmHg, or clinic diastolic BP ≥ 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM $\geq 135/85$ mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM $\geq 150/95$ mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55 -years-old: ACE inhibitor (A)
- patients > 55 -years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP $\geq 140/90$ mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

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Next


A 52-year-old man of Afro-Caribbean descent is reviewed after having ambulatory blood pressure monitoring (ABPM). This had been ordered after a works medical recorded a blood pressure of 156/86 mmHg. He smokes 20 cigarettes/day and has a family history of ischaemic heart disease. The results show the following:

Average daytime blood pressure: 142/88 mmHg

QRISK 10 year cardiovascular risk: 23%

Urine dipstick: NAD

ECG: sinus rhythm, rate 78/min

Na ⁺	141 mmol/l
K ⁺	4.6 mmol/l
Urea	4.5 mmol/l
Creatinine	82  mol/l
Total cholesterol	5.4 mmol/l
HDL cholesterol	0.9 mmol/l
Fasting glucose	5.3 mmol/l

What is the most appropriate course of action?



A. Start treatment with a calcium channel blocker



B. Diagnose stage 1 hypertension and advise about lifestyle changes

- | | |
|-----------------------|--|
| <input type="radio"/> | C. Start treatment with an ACE inhibitor |
| <input type="radio"/> | D. Start treatment with a thiazide-like diuretic |
| <input type="radio"/> | E. Repeat the ABPM |

[Next question](#)

Stage 1 hypertension is defined by an ABPM reading of $\geq 135/85$ mmHg, with stage 2 hypertension having a cut-off of $\geq 150/95$ mmHg.

This patient therefore has stage 1 hypertension. We should therefore treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater, as is present in this case.

ACE inhibitors are usually the treatment of choice for patients < 55 -years-old but as this patient is of Afro-Caribbean descent a calcium channel blocker should be used instead.

Hypertension: diagnosis

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)

Why were these guidelines needed?

It has long been recognised by doctors that there is a subgroup of patients whose blood pressure climbs 20 mmHg whenever they enter a clinical setting, so called 'white coat hypertension'. If we just rely on clinic readings then such patients may be diagnosed as having hypertension when the vast majority of time their blood pressure is normal.

This has led to the use of both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. These techniques allow a more accurate assessment of a patient's overall blood pressure. Not only does this help prevent overdiagnosis of hypertension - ABPM has been shown to be a more accurate predictor of cardiovascular events than clinic readings.

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Diagnosing hypertension

Firstly, NICE recommend measuring blood pressure in both arms when considering a diagnosis of hypertension.

If the difference in readings between arms is more than 20 mmHg then the measurements should be repeated. If the difference remains > 20 mmHg then subsequent blood pressures should be recorded from the arm with the higher reading.

It should of course be remember that there are pathological causes of unequal blood pressure readings from the arms, such as supralvalvular aortic stenosis. It is therefore prudent to listen to the heart sounds if a difference exists and further investigation if a very large difference is noted.

NICE also recommend taking a second reading during the consultation, if the first reading is $> 140/90$ mmHg. The lower reading of the two should determine further management.

NICE suggest offering ABPM or HBPM to any patient with a blood pressure $\geq 140/90$ mmHg.

If however the blood pressure is $\geq 180/110$ mmHg:

- immediate treatment should be considered
- if there are signs of papilloedema or retinal haemorrhages NICE recommend same day assessment by a specialist
- NICE also recommend referral if a phaeochromocytoma is suspected (labile or postural hypotension, headache, palpitations, pallor and diaphoresis)

Ambulatory blood pressure monitoring (ABPM)

- at least 2 measurements per hour during the person's usual waking hours (for example, between 08:00 and 22:00)
- use the average value of at least 14 measurements

If ABPM is not tolerated or declined HBPM should be offered.

Home blood pressure monitoring (HBPM)

- for each BP recording, two consecutive measurements need to be taken, at least 1 minute apart and with the person seated
- BP should be recorded twice daily, ideally in the morning and evening
- BP should be recorded for at least 4 days, ideally for 7 days
- discard the measurements taken on the first day and use the average value of all the remaining measurements

Interpreting the results

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

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Next

A 58-year-old man presents with intermittent chest pains for the past 3 days. The pain is described as sharp and often occurs at rest but is generally worse when he climbs the stairs or exerts himself. An ECG is taken:



© Image used on license from [Dr Smith, University of Minnesota](#)



What is shown on the ECG?



- ☒ A. Ongoing myocardial ischaemia
- ☐ B. Right bundle branch block
- ☐ C. Old anterior myocardial infarction
- ☐ D. Normal ECG
- ☐ E. Hypokalaemia

Next question

First of all the history is suggestive of unstable angina - intermittent pains occurring both at rest and also during exertion. The ECG shows T-wave changes in V2-V5, I, and aVL. These changes are very suggestive of a significant left anterior descending lesion. When the patient has pain it is likely the artery is briefly closing.

It's probably too much detail for the AKT but these changes are known as Wellens' syndrome - T waves changes seen due to proximal left anterior descending lesions which manifest clinically as unstable angina. The diagnostic criteria are:

- progressive symmetrical deep T wave inversion in leads V2 and V3
- slope of inverted T waves generally at 60°-90°

- little or no cardiac marker elevation
- discrete or no ST segment elevation
- no loss of precordial R waves.
- pattern abnormal during chest-pain free periods

ECG: myocardial ischaemia

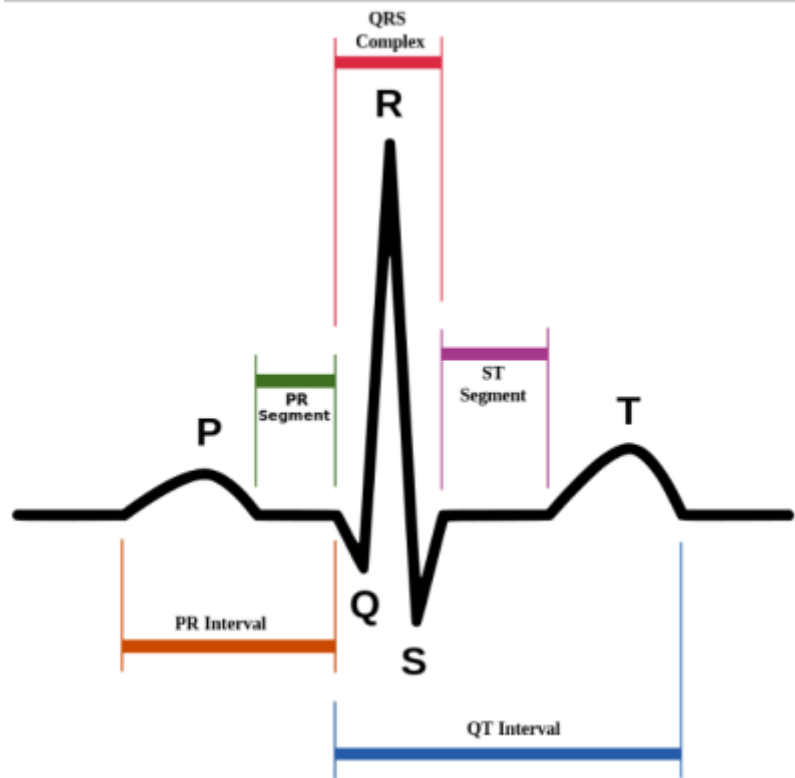
One of the main uses of the ECG is to determine whether a patient is having a cardiac event in the context of chest pain. A wide variety of changes can be seen depending on what type of ischaemic event is happening, where it is happening and when it happened.

Acute myocardial infarction (MI)

- hyperacute T waves are often the first sign of MI but often only persists for a few minutes
- ST elevation may then develop
- the T waves typically become inverted within the first 24 hours. The inversion of the T waves can last for days to months
- pathological Q waves develop after several hours to days. This change usually persists indefinitely

Definition of ST elevation*

- new ST elevation at the J-point in two contiguous leads with the cut-off points: ≥ 0.2 mV in men or ≥ 0.15 mV in women in leads V2-V3 and/or ≥ 0.1 mV in other leads



*Thygesen K et al. Universal definition of myocardial infarction. Circulation 2007 Nov 27; 116(22) 2634-53. doi:10.1161/CIRCULATIONAHA.107.187397 pmid:17951284

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Next

What is the target INR for a patient with a mechanical mitral valve?

- ☐ A. 4.0-4.5
- ☐ B. 4.0
- ☐ C. 3.0-4.0



D. 2.5-3.5



E. 2.0-3.0

[Next question](#)

Mechanical valves - target INR:

- aortic: 2.0-3.0
- mitral: 2.5-3.5

Prosthetic heart valves

The most common valves which need replacing are the aortic and mitral valve. There are two main options for replacement: biological (bioprosthetic) or mechanical.

Biological (bioprosthetic) valves	Mechanical valves
<p>Usually bovine or porcine in origin</p> <p>Major disadvantage is structural deterioration and calcification over time. Most older patients (> 65 years for aortic valves and > 70 years for mitral valves) receive a bioprosthetic valve</p> <p>Long-term anticoagulation not usually needed. Warfarin may be given for the first 3 months depending on patient factors. Low-dose aspirin is given long-term.</p>	<p>The most common type now implanted is the bileaflet valve. Ball-and-cage valves are rarely used nowadays</p> <p>Mechanical valves have a low failure rate</p> <p>Major disadvantage is the increased risk of thrombosis meaning long-term anticoagulation is needed. Aspirin is normally given in addition unless there is a contraindication.</p> <p>Target INR</p> <ul style="list-style-type: none">• aortic: 2.0-3.0• mitral: 2.5-3.5

Following the 2008 NICE guidelines for prophylaxis of endocarditis antibiotics are no longer recommended for common procedures such as dental work.

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Next

A 78-year-old man with a four month history of exertional chest pain is reviewed. The pain typically comes on when he is walking up a hill, is centrally located and radiates to the left arm. It then settles with rest after about 2-3 minutes. Clinical examination and a resting 12 lead ECG are normal. Following NICE guidelines, what is the most appropriate diagnostic strategy?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. CT calcium scoring |
| <input checked="" type="radio"/> | B. Manage as angina, no further diagnostic tests required |
| <input type="radio"/> | C. Exercise tolerance test |
| <input type="radio"/> | D. MPS with SPECT |
| <input type="radio"/> | E. Coronary angiography |

Next question

NICE do not recommend any further investigation for patients with an estimated coronary artery disease risk of greater than 90%. This includes all men over the age of 70 years who have typical symptoms.

Chest pain: assessment of patients with suspected cardiac chest pain

NICE issued guidelines in 2010 on the 'Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin'.

Below is a brief summary of the key points. Please see the link for more details.

Patients presenting with acute chest pain

Immediate management of suspected acute coronary syndrome (ACS)

- glyceryl trinitrate
- aspirin 300mg. NICE do not recommend giving other antiplatelet agents (i.e. Clopidogrel) outside of hospital
- do not routinely give oxygen, only give if sats < 94%*
- perform an ECG as soon as possible but do not delay transfer to hospital. A normal ECG does not exclude ACS

Referral

- current chest pain or chest pain in the last 12 hours with an abnormal ECG: emergency admission
- chest pain 12-72 hours ago: refer to hospital the same-day for assessment
- chest pain > 72 hours ago: perform full assessment with ECG and troponin measurement before deciding upon further action

*NICE suggest the following in terms of oxygen therapy:

- do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:
- people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94-98%
- people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88-92% until blood gas analysis is available.

Patients presenting with stable chest pain

With all due respect to NICE the guidelines for assessment of patients with stable chest pain are rather complicated. They suggest an approach where the risk of a patient having coronary artery disease (CAD) is calculated based on their symptoms (whether they have typical angina, atypical angina or non-anginal chest pain), age, gender and risk factors.

NICE define anginal pain as the following:

- 1. constricting discomfort in the front of the chest, neck, shoulders, jaw or arms
- 2. precipitated by physical exertion
- 3. relieved by rest or GTN in about 5 minutes
- patients with all 3 features have typical angina
- patients with 2 of the above features have atypical angina
- patients with 1 or none of the above features have non-anginal chest pain

The risk tables are not reproduced here but can be found by clicking on the link.

If patients have typical anginal symptoms and a risk of CAD is greater than 90% then no further diagnostic testing is required. It should be noted that all men over the age of 70 years who have

typical anginal symptoms fall into this category.

For patients with an estimated risk of 10-90% the following investigations are recommended. Note the absence of the exercise tolerance test:

Estimated likelihood of CAD	Diagnostic testing
61-90%	Coronary angiography
30-60%	Functional imaging, for example: <ul style="list-style-type: none">• myocardial perfusion scan with SPECT• stress echocardiography• first-pass contrast-enhanced magnetic resonance (MR) perfusion• MR imaging for stress-induced wall motion abnormalities.
10-29%	CT calcium scoring

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Next

A 74-year-old man with symptomatic aortic stenosis is reviewed in the cardiology clinic. He is otherwise fit and well and keen for intervention if possible. What type of intervention is he most likely to be offered?

- ☐ A. Annual echocardiography, intervention when valve gradient > 75 mmHg
- ☐ B. Aortic bypass graft
- ☒ C. Bioprosthetic aortic valve replacement
- ☐ D. Balloon valvuloplasty
- ☐ E. Mechanical aortic valve replacement

Next question

Prosthetic heart valves - mechanical valves last longer and tend to be given to younger patients

Prosthetic heart valves

The most common valves which need replacing are the aortic and mitral valve. There are two main options for replacement: biological (bioprosthetic) or mechanical.

Biological (bioprosthetic) valves	Mechanical valves
<p>Usually bovine or porcine in origin</p> <p>Major disadvantage is structural deterioration and calcification over time. Most older patients (> 65 years for aortic valves and > 70 years for mitral valves) receive a bioprosthetic valve</p> <p>Long-term anticoagulation not usually needed. Warfarin may be given for the first 3 months depending on patient factors. Low-dose aspirin is given long-term.</p>	<p>The most common type now implanted is the bileaflet valve. Ball-and-cage valves are rarely used nowadays</p> <p>Mechanical valves have a low failure rate</p> <p>Major disadvantage is the increased risk of thrombosis meaning long-term anticoagulation is needed. Aspirin is normally given in addition unless there is a contraindication.</p> <p>Target INR</p> <ul style="list-style-type: none">• aortic: 2.0-3.0• mitral: 2.5-3.5

Following the 2008 NICE guidelines for prophylaxis of endocarditis antibiotics are no longer recommended for common procedures such as dental work.

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Next

You are doing a medication review on a 62-year-old man. Six months ago he had a stroke secondary to an intracerebral haemorrhage. His other past medical history includes hypertension, depression and type 2 diabetes mellitus. His latest 10-year cardiovascular risk is 8%. Which one of the following medications should you consider stopping?

- | | |
|----------------------------------|----------------|
| <input type="radio"/> | A. Indapamide |
| <input type="radio"/> | B. Losartan |
| <input checked="" type="radio"/> | C. Simvastatin |
| <input type="radio"/> | D. Glipizide |
| <input type="radio"/> | E. Sertraline |

Next question

Statins should be avoided in patients with a recent intracerebral haemorrhage as there is some evidence that they may increase the risk of further haemorrhage. This should, of course, always be balanced against the overall cardiovascular risk profile but a 10-year risk score of only 8% would not really justify this. Please see the Royal College of Physicians stroke guidelines for more details.

Statins

Statins inhibit the action of HMG-CoA reductase, the rate-limiting enzyme in hepatic cholesterol synthesis

Adverse effects

- myopathy: includes myalgia, myositis, rhabdomyolysis and asymptomatic raised creatine kinase. Risk factors for myopathy include advanced age, female sex, low body mass index and presence of multisystem disease such as diabetes mellitus. Myopathy is more common in lipophilic statins (simvastatin, atorvastatin) than relatively hydrophilic statins (rosuvastatin, pravastatin, fluvastatin)
- liver impairment: the 2014 NICE guidelines recommend checking LFTs at baseline, 3 months and 12 months. Treatment should be discontinued if serum transaminase concentrations rise to and persist at 3 times the upper limit of the reference range
- there is some evidence that statins may increase the risk of intracerebral haemorrhage in patients who've previously had a stroke. This effect is not seen in primary prevention. For

this reason the Royal College of Physicians recommend avoiding statins in patients with a history of intracerebral haemorrhage

Who should receive a statin?

- all people with established cardiovascular disease (stroke, TIA, ischaemic heart disease, peripheral arterial disease)
- following the 2014 update, NICE recommend anyone with a 10-year cardiovascular risk $\geq 10\%$
- patients with type 2 diabetes mellitus should now be assessed using QRISK2 like other patients are, to determine whether they should be started on statins

Statins should be taken at night as this is when the majority of cholesterol synthesis takes place. This is especially true for simvastatin which has a shorter half-life than other statins

Current guidelines for lipid lowering*

	Total cholesterol (mmol/l)	LDL cholesterol
Joint British Societies	< 4.0	< 2.0
National Service Framework for CHD	< 5.0	< 3.0
SIGN 2007	< 5.0	< 3.0

*current NICE guidelines do not recommend a target cholesterol in primary prevention

Question 153 of 156[Next](#)

Which one of the following calcium channel blockers is most likely to precipitate pulmonary oedema in a patient with known chronic heart failure?

- ☐ A. Amlodipine
- ☐ B. Diltiazem
- ☐ C. Felodipine
- ☒ D. Verapamil
- ☐ E. Nifedipine

[Next question](#)

Verapamil is the most highly negatively inotropic calcium channel blocker

Calcium channel blockers

Calcium channel blockers are primarily used in the management of cardiovascular disease. Voltage-gated calcium channels are present in myocardial cells, cells of the conduction system and those of the vascular smooth muscle. The various types of calcium channel blockers have varying effects on these three areas and it is therefore important to differentiate their uses and actions.

Examples	Indications & notes	Side-effects and cautions
Verapamil	Angina, hypertension, arrhythmias Highly negatively inotropic Should not be given with beta-blockers as may cause heart block	Heart failure, constipation, hypotension, bradycardia, flushing
Diltiazem	Angina, hypertension Less negatively inotropic than verapamil but caution	Hypotension, bradycardia, heart failure, ankle swelling

	should still be exercised when patients have heart failure or are taking beta-blockers	
Nifedipine, amlodipine, felodipine (dihydropyridines)	Hypertension, angina, Raynaud's Affects the peripheral vascular smooth muscle more than the myocardium and therefore do not result in worsening of heart failure	Flushing, headache, ankle swelling

Question 154 of 156

Next

You review an 81-year-old man with regards to his hypertensive therapy. He is currently taking a combination of losartan and amlodipine which is failing to keep his blood pressure within target. What is the most appropriate next step assuming he has no relevant contraindications?

- ✓ ☒ A. Add indapamide MR 1.5mg od
- ☐ B. Add atenolol 50mg od
- ☐ C. Add ramipril 1.25mg od
- ☐ D. Add doxazosin 1mg od
- ☐ E. Add bendroflumethiazide 2.5mg od

Next question

NICE now advise using alternatives to bendroflumethiazide. Patients already taking bendroflumethiazide should however not be switched over to alternative thiazide-type diuretics.

This patient is taking an angiotensin 2 receptor blocker (losartan), possibly due to having problems with ACE inhibitor therapy previously, for example a dry cough. Patients should not normally take an ACE inhibitor and A2RB at the same time.

Hypertension: management

NICE published updated guidelines for the management of hypertension in 2011. Some of the key changes include:

- classifying hypertension into stages
- recommending the use of ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM)
- calcium channel blockers are now considered superior to thiazides
- bendroflumethiazide is no longer the thiazide of choice

Blood pressure classification

This becomes relevant later in some of the management decisions that NICE advocate.

Stage	Criteria
Stage 1 hypertension	Clinic BP \geq 140/90 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 135/85 mmHg
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average BP \geq 150/95 mmHg
Severe hypertension	Clinic systolic BP \geq 180 mmHg, or clinic diastolic BP \geq 110 mmHg

Managing hypertension

Lifestyle advice should not be forgotten and is frequently tested in exams:

- a low salt diet is recommended, aiming for less than 6g/day, ideally 3g/day. The average adult in the UK consumes around 8-12g/day of salt. A recent BMJ paper* showed that lowering salt intake can have a significant effect on blood pressure. For example, reducing salt intake by 6g/day can lower systolic blood pressure by 10mmHg
- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

ABPM/HBPM \geq 150/95 mmHg (i.e. stage 2 hypertension)

- offer drug treatment regardless of age

For patients < 40 years consider specialist referral to exclude secondary causes.

Step 1 treatment

- patients < 55-years-old: ACE inhibitor (A)
- patients > 55-years-old or of Afro-Caribbean origin: calcium channel blocker

Step 2 treatment

- ACE inhibitor + calcium channel blocker (A + C)

Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)
- NICE now advocate using either chlorthalidone (12.5-25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide

NICE define a clinic BP \geq 140/90 mmHg after step 3 treatment with optimal or best tolerated doses as resistant hypertension. They suggest step 4 treatment or seeking expert advice

Step 4 treatment

- consider further diuretic treatment
- if potassium < 4.5 mmol/l add spironolactone 25mg od
- if potassium > 4.5 mmol/l add higher-dose thiazide-like diuretic treatment
- if further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker

Patients who fail to respond to step 4 measures should be referred to a specialist. NICE recommend:

If blood pressure remains uncontrolled with the optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

Blood pressure targets

	Clinic BP	ABPM / HBPM
Age < 80 years	140/90 mmHg	135/85 mmHg
Age > 80 years	150/90 mmHg	145/85 mmHg

New drugs

Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen
- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 155 of 156

Next

A 64-year-old man comes for review in the hypertension clinic. He currently takes a combination of amlodipine and ramipril. There is no other past medical history of note. He monitors his own blood pressure at home and always brings the readings to surgery on a printed out spreadsheet. What is the target blood pressure for these home readings?



A. $\leq 150/90$ mmHg

- ☐ B. $\leq 130/80$ mmHg
- ☐ C. $\leq 140/90$ mmHg
- ☐ D. $\leq 140/80$ mmHg
-  ☒ E. $\leq 135/85$ mmHg

Next question

Hypertension: management

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- caffeine intake should be reduced
- the other general bits of advice remain: stop smoking, drink less alcohol, eat a balanced diet rich in fruit and vegetables, exercise more, lose weight

ABPM/HBPM \geq 135/85 mmHg (i.e. stage 1 hypertension)

- treat if < 80 years of age AND any of the following apply; target organ damage, established cardiovascular disease, renal disease, diabetes or a 10-year cardiovascular risk equivalent to 20% or greater

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Step 3 treatment

- add a thiazide diuretic (D, i.e. A + C + D)

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Direct renin inhibitors

- e.g. Aliskiren (branded as Rasilez)
- by inhibiting renin blocks the conversion of angiotensinogen to angiotensin I
- no trials have looked at mortality data yet. Trials have only investigated fall in blood pressure. Initial trials suggest aliskiren reduces blood pressure to a similar extent as angiotensin converting enzyme (ACE) inhibitors or angiotensin-II receptor antagonists
- adverse effects were uncommon in trials although diarrhoea was occasionally seen

- only current role would seem to be in patients who are intolerant of more established antihypertensive drugs

Question 156 of 156

A 72-year-old man is investigated for exertional chest pain and has a positive exercise tolerance test. He declines an angiogram and is discharged on a combination of aspirin 75mg od, simvastatin 40mg on, atenolol 50mg od and a GTN spray prn. Examination reveals a pulse of 72 bpm and a blood pressure of 130/80 mmHg. On review he is still regularly using his GTN spray. What is the most appropriate next step in management?

- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Add nifedipine MR 30mg od |
| <input type="radio"/> | B. Add isosorbide mononitrate 30mg bd |
| <input checked="" type="radio"/> | C. Increase atenolol to 100mg od |
| <input type="radio"/> | D. Add nicorandil 10mg bd |
| <input type="radio"/> | E. Add verapamil 80mg tds |

The BNF recommends an atenolol dose of 100mg daily in 1 or 2 doses for angina. A pulse rate of 72 bpm also suggests that he is not adequately beta-blocked anyway. The starting dose of isosorbide mononitrate is 10mg bd.

Angina pectoris: drug management

The management of stable angina comprises lifestyle changes, medication, percutaneous coronary intervention and surgery. NICE produced guidelines in 2011 covering the management of stable angina

Medication

- all patients should receive aspirin and a statin in the absence of any contraindication
- sublingual glyceryl trinitrate to abort angina attacks
- NICE recommend using either a beta-blocker or a calcium channel blocker first-line based on 'comorbidities, contraindications and the person's preference'

- if a calcium channel blocker is used as monotherapy a rate-limiting one such as verapamil or diltiazem should be used. If used in combination with a beta-blocker then use a long-acting dihydropyridine calcium-channel blocker (e.g. modified-release nifedipine). Remember that beta-blockers should not be prescribed concurrently with verapamil (risk of complete heart block)
- if there is a poor response to initial treatment then medication should be increased to the maximum tolerated dose (e.g. for atenolol 100mg od)
- if a patient is still symptomatic after monotherapy with a beta-blocker add a calcium channel blocker and vice versa
- if a patient is on monotherapy and cannot tolerate the addition of a calcium channel blocker or a beta-blocker then consider one of the following drugs: a long-acting nitrate, ivabradine, nicorandil or ranolazine
- if a patient is taking both a beta-blocker and a calcium-channel blocker then only add a third drug whilst a patient is awaiting assessment for PCI or CABG

Nitrate tolerance

- many patients who take nitrates develop tolerance and experience reduced efficacy
- the BNF advises that patients who develop tolerance should take the second dose of isosorbide mononitrate after 8 hours, rather than after 12 hours. This allows blood-nitrate levels to fall for 4 hours and maintains effectiveness
- this effect is not seen in patients who take modified release isosorbide mononitrate

Ivabradine

- a new class of anti-anginal drug which works by reducing the heart rate
- acts on the I_f ('funny') ion current which is highly expressed in the sinoatrial node, reducing cardiac pacemaker activity
- adverse effects: visual effects, particular luminous phenomena, are common. Bradycardia, due to the mechanism of action, may also be seen
- there is no evidence currently of superiority over existing treatments of stable angina

=====



Question 1 of 71

Next

An 18-year-old female presents to her GP as she has missed one of her Microgynon 30 pills yesterday morning. She has taken Microgynon for the past 2 years and is currently 4 days into a packet of pills. She had sexual intercourse last night and is unsure what to do. She took yesterday's pill and today's pill this morning. What is the correct management?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Advise condom use for next 7 days |
| <input type="radio"/> | B. Perform a pregnancy test |
| <input type="radio"/> | C. Omit pill break at end of pack |
| <input checked="" type="radio"/> | D. No action needed |
| <input type="radio"/> | E. Emergency contraception should be offered |

Next question

As she has only missed one pill no action is needed. For further information please consult the link to the FSRH guidelines.

The October 2011 AKT feedback stated: *'With regard to AKT 13, knowledge about basic contraceptive issues seemed to be lacking.'*

Combined oral contraceptive pill: missed pill

The advice from the Faculty of Sexual and Reproductive Healthcare (FSRH) has changed over recent years. The following recommendations are now made for women taken a combined oral contraceptive (COC) pill containing 30-35 micrograms of ethinylestradiol

If 1 pill is missed (at any time in the cycle)

- take the last pill even if it means taking two pills in one day and then continue taking pills daily, one each day
- no additional contraceptive protection needed

If 2 or more pills missed

- take the last pill even if it means taking two pills in one day, leave any earlier missed pills and then continue taking pills daily, one each day
- the women should use condoms or abstain from sex until she has taken pills for 7 days in a row. FSRH: *'This advice may be overcautious in the second and third weeks, but the advice is a backup in the event that further pills are missed'*
- if pills are missed in week 1 (Days 1-7): emergency contraception should be considered if she had unprotected sex in the pill-free interval or in week 1
- if pills are missed in week 2 (Days 8-14): after seven consecutive days of taking the COC there is no need for emergency contraception*
- if pills are missed in week 3 (Days 15-21): she should finish the pills in her current pack and start a new pack the next day; thus omitting the pill free interval

*theoretically women would be protected if they took the COC in a pattern of 7 days on, 7 days off



Question 2 of 71

Next

Which one of the following statements regarding the link between intrauterine devices (IUDs) and ectopic pregnancies is correct?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. The proportion of pregnancies that are ectopic is increased and the absolute number is increased |
| <input checked="" type="radio"/> | B. The proportion of pregnancies that are ectopic is increased but the absolute number is decreased |
| <input type="radio"/> | C. Having an intrauterine device has no effect on the rate of ectopic pregnancies |
| <input type="radio"/> | D. The proportion of pregnancies that are ectopic is decreased and the absolute number is decreased |
| <input type="radio"/> | E. The proportion of pregnancies that are ectopic is decreased but the absolute number is increased |

Next question

IUCD - the proportion of pregnancies that are ectopic is increased but the absolute number is decreased

The October 2011 AKT feedback stated: *'With regard to AKT 13, knowledge about basic contraceptive issues seemed to be lacking.'*

Intrauterine contraceptive devices

Intrauterine contraceptive devices comprise both conventional copper intrauterine devices (IUDs) and levonorgestrel-releasing intrauterine systems (IUS, Mirena). The IUS is also used in the management of menorrhagia

Effectiveness

- both the IUD and IUS are more than 99% effective

Mode of action

- IUD: primary mode of action is prevention of fertilisation by causing decreased sperm motility and survival (possibly an effect of copper ions)
- IUS: levonorgestrel prevents endometrial proliferation and causes cervical mucous thickening

Counselling

- IUD is effective immediately following insertion
- IUS can be relied upon after 7 days

Potential problems

- IUDs make periods heavier, longer and more painful
- the IUS is associated with initial frequent uterine bleeding and spotting. Later women typically have intermittent light menses with less dysmenorrhoea and some women become amenorrhoeic
- uterine perforation: up to 2 per 1000 insertions
- the proportion of pregnancies that are ectopic is increased but the absolute number of ectopic pregnancies is reduced, compared to a woman not using contraception
- infection: there is a small increased risk of pelvic inflammatory disease in the first 20 days after insertion but after this period the risk returns to that of a standard population
- expulsion: risk is around 1 in 20, and is most likely to occur in the first 3 months



Question 3 of 71

Next

Which one of the following is not a recognised adverse effect of the combined oral contraceptive pill?



<input checked="" type="radio"/>	A. Increased risk of ovarian cancer
<input type="radio"/>	B. Increased risk of deep vein thrombosis
<input type="radio"/>	C. Increased risk of breast cancer
<input type="radio"/>	D. Increased risk of ischaemic heart disease
<input type="radio"/>	E. Increased risk of cervical cancer

Next question

Combined oral contraceptive pill

- increased risk of breast and cervical cancer
- protective against ovarian and endometrial cancer

The combined oral contraceptive pill has actually been shown to reduce the risk of ovarian cancer

Combined oral contraceptive pill: advantages/disadvantages

Advantages of combined oral contraceptive pill

- highly effective (failure rate < 1 per 100 woman years)
- doesn't interfere with sex
- contraceptive effects reversible upon stopping
- usually makes periods regular, lighter and less painful
- reduced risk of ovarian, endometrial and colorectal cancer
- may protect against pelvic inflammatory disease
- may reduce ovarian cysts, benign breast disease, acne vulgaris

Disadvantages of combined oral contraceptive pill

- people may forget to take it
- offers no protection against sexually transmitted infections
- increased risk of venous thromboembolic disease
- increased risk of breast and cervical cancer
- increased risk of stroke and ischaemic heart disease (especially in smokers)
- temporary side-effects such as headache, nausea, breast tenderness may be seen

Whilst some users report weight gain whilst taking the combined oral contraceptive pill a Cochrane review did not support a causal relationship



Question 4 of 71

Next

Which one of the following is not an absolute contraindication to combined oral contraceptive pill use?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Blood pressure 165/100 (confirmed on three readings) |
| <input type="radio"/> | B. Continuous use before, during and after a total knee replacement |
| <input checked="" type="radio"/> | C. Breast feeding a 10-week-old baby |
| <input type="radio"/> | D. Deep vein thrombosis 9 years ago |
| <input type="radio"/> | E. A 39-year-old who smokes 20 cigarettes/day |

Next question

Breast feeding < 6 weeks postpartum is UKMEC category 4 where as after this time it is UKMEC category 3

Combined oral contraceptive pill: contraindications

The decision of whether to start a women on the combined oral contraceptive pill is now guided by the UK Medical Eligibility Criteria (UKMEC). This scale categorises the potential cautions and contraindications according to a four point scale, as detailed below:

- UKMEC 1: a condition for which there is no restriction for the use of the contraceptive method

- UKMEC 2: advantages generally outweigh the disadvantages
- UKMEC 3: disadvantages generally outweigh the advantages
- UKMEC 4: represents an unacceptable health risk

Examples of UKMEC 3 conditions include

- more than 35 years old and smoking less than 15 cigarettes/day
- BMI > 35 kg/m²*
- migraine without aura and more than 35 years old
- family history of thromboembolic disease in first degree relatives < 45 years
- controlled hypertension
- immobility e.g. wheel chair use
- breast feeding 6 weeks - 6 months postpartum

Examples of UKMEC 4 conditions include

- more than 35 years old and smoking more than 15 cigarettes/day
- migraine with aura
- history of thromboembolic disease or thrombogenic mutation
- history of stroke or ischaemic heart disease
- breast feeding < 6 weeks post-partum
- uncontrolled hypertension
- breast cancer
- major surgery with prolonged immobilisation

Diabetes mellitus diagnosed > 20 years ago is classified as UKMEC 3 or 4 depending on severity

*The UKMEC 4 rating for a BMI > 40 kg/m² was removed in 2009.



Question 5 of 71

Next

A 25-year-old woman phones for advice. She is prescribed Microgynon 30 for contraception which she has taken for the past two years. She has just returned from a weekend away with her partner and forgot to take her Microgynon 30 pills and has missed two in a row. During the weekend she had

regular intercourse with her partner. Today she should be taking the 19th pill of the packet and reports not missing any other pills. You tell her to take two of her pills as soon as possible. What is the most appropriate further advice to give her?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Needs emergency contraception + use condoms for the next 7 days + skip the 7 day break |
| <input checked="" type="radio"/> | B. Use condoms for the next 7 days + skip the 7 day break |
| <input type="radio"/> | C. Needs emergency contraception + skip the 7 day break |
| <input type="radio"/> | D. Needs emergency contraception + use condoms for the next 7 days |
| <input type="radio"/> | E. Use condoms for the next 7 days |

Next question

The Faculty of Sexual and Reproductive Healthcare (FSRH) recommend using condoms for 7 days once 2 pills have been missed. If pills are missed in week 3 (days 15-21) she should finish the pills in her current pack and start a new pack the next day, thus omitting the pill free interval.

Combined oral contraceptive pill: missed pill

The advice from the Faculty of Sexual and Reproductive Healthcare (FSRH) has changed over recent years. The following recommendations are now made for women taken a combined oral contraceptive (COC) pill containing 30-35 micrograms of ethinylestradiol

If 1 pill is missed (at any time in the cycle)

- take the last pill even if it means taking two pills in one day and then continue taking pills daily, one each day
- no additional contraceptive protection needed

If 2 or more pills missed

- take the last pill even if it means taking two pills in one day, leave any earlier missed pills and then continue taking pills daily, one each day
- the women should use condoms or abstain from sex until she has taken pills for 7 days in a row. FSRH: *'This advice may be overcautious in the second and third weeks, but the advice is a backup in the event that further pills are missed'*

- if pills are missed in week 1 (Days 1-7): emergency contraception should be considered if she had unprotected sex in the pill-free interval or in week 1
- if pills are missed in week 2 (Days 8-14): after seven consecutive days of taking the COC there is no need for emergency contraception*
- if pills are missed in week 3 (Days 15-21): she should finish the pills in her current pack and start a new pack the next day; thus omitting the pill free interval

*theoretically women would be protected if they took the COC in a pattern of 7 days on, 7 days off



Question 6 of 71

Next

A 19-year-old female presents to surgery asking to start an oral contraceptive pill. She has no significant past medical history or family history of note. If a combined pill is chosen, what is the most appropriate of the options given below?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Ethinylestradiol 35 mcg with norethisterone 1mg |
| <input type="radio"/> | B. Ethinylestradiol 50 mcg with levonorgestrel 150 mcg |
| <input type="radio"/> | C. Ethinylestradiol 20 mcg with gestodene 75 mcg |
| <input type="radio"/> | D. Ethinylestradiol 20 mcg with norethisterone 1mg |
| <input checked="" type="radio"/> | E. Ethinylestradiol 30 mcg with levonorgestrel 150 mcg |



Next question

The faculty recommend a pill with 30 mcg of oestrogen for first-time combined oral contraceptive pill users

Combined oral contraceptive pill: choice of pill

The combined oral contraceptive pill method (COCP) varies by both the amount of oestrogen and progestogen and also the presentation (e.g. everyday pill/phasic preparation, patches etc)

For first time users

- consider using a pill containing 30 mcg ethinylestradiol with levonorgestrel/norethisterone (e.g. Microgynon 30 - ethinylestradiol 30 mcg with levonorgestrel 150 mcg)

There have been two new COCPs developed in recent years which work slightly differently compared to traditional pills - Qlaira and Yaz.

Qlaira

Qlaira is a combination of estradiol valerate (as opposed to the usual ethinylestradiol) and dienogest. It has a quadruphasic dosage regimen which is designed to give optimal cycle control. Users take a pill everyday of a 28 day cycle, with 26 of the pills containing estradiol +/- dienogest and 2 of the pills being inactive. During the cycle the dose of estradiol is gradually reduced and that of dienogest is increased:

Day of cycle	Estradiol	Dienogest
1 - 2	3mg	-
3 - 7	2mg	2mg
8 - 24	2mg	3mg
25 - 26	1mg	-
27 - 28	-	-

The idea is to give women a more 'natural' cycle with more constant oestrogen levels. The efficacy is similar to that of other COCPs with a Pearl Index of 0.4 failures per 100 women-years in subjects aged 18-35 years

Disadvantages

- cost: currently £8.39 per month, which is considerably more than some standard COCPs which can cost < 70p per month
- limited safety data to date. For the time being the FSRH suggest using standard COCP UKMEC criteria
- there are different missed pill rules for Qlaira (see below)

Missed pill rules for Qlaira

These are complicated! If a pill is taken 12 hours late it is classed as 'missed' (compared to 24 hours for standard COCPs). It's better to remember that the rules are different for Qlaira and know to look them up if it happens.

If a woman has missed more than 2 pills

- emergency contraception may be needed

If a woman has missed 1 pill:

Day	Action
1-17	Take missed pill immediately and the next tablet at the usual time (even if means taking two on same day) Continue with the tablet taking in the normal way Abstain or use an additional contraceptive method for 9 days
18-24	Discard the rest of the packet Start taking the Day 1 pill from a new packet immediately and continue taking these pills at the correct time Abstain or use an additional contraceptive method for 9 days
25-26	Take the missed tablet immediately and the next tablet at the usual time (even if it means taking two tablets on the same day) Additional contraception is not necessary
27-28	Discard the forgotten table and continue tablet taking in the normal way. Additional contraception is not necessary

Yaz

A product combining 20mcg ethinylestradiol with 3mg drospirenone is soon to be launched in the UK. In the US and Europe it is branded as Yaz and has an interesting 24/4 regime, as opposed to the normal 21/7 cycle. The idea is that a shorter pill-free interval is both better for patients with troublesome premenstrual symptoms and is also more effective at preventing ovulation. Studies have shown Yaz causes less pre-menstrual syndrome and blood loss reduced by 50-60%.



Which one of the following statements regarding the use of the combined oral contraceptive pill in women aged over 40 years is true?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Women over the age of 40 years should use a pill containing at least 35 µg of ethinylestradiol |
| <input type="radio"/> | B. The use of the combined oral contraceptive pill is contraindicated |
| <input type="radio"/> | C. Combined oral contraceptive pill use may worsen perimenopausal symptoms |
| <input checked="" type="radio"/> | D. The combined oral contraceptive pill may help to maintain bone mineral density |
| <input type="radio"/> | E. Can be stopped at the age of 50 years and no alternative method used due to declining fertility |

Next question

The combined oral contraceptive pill may ease some perimenopausal symptoms and maintain bone mineral density

Contraception for women aged > 40 years

Whilst fertility has usually significantly declined by the age of 40 years women still require effective contraception until the menopause. The Faculty of Sexual and Reproductive Healthcare (FSRH) have produced specific guidance looking at this age group - 'Contraception for Women Aged Over 40 Years' - a link is provided below.

Specific methods

No method of contraception is contraindicated by age alone. All methods are UKMEC1 except for the combined oral contraceptive pill (UKMEC2 for women ≥ 40 years) and Depo-Provera (UKMEC2 for women > 45 years). The guidance issued by the FSRH contained a number of points which should be considered about each method:

Combined oral contraceptive pill (COCP)

- COCP use in the perimenopausal period may help to maintain bone mineral density
- COCP use may help reduce menopausal symptoms
- a pill containing < 30 µg ethinylestradiol may be more suitable for women > 40 years

Depo-Provera

- women should be advised there may be a delay in the return of fertility of up to 1 year for women > 40 years
- use is associated with a small loss in bone mineral density which is usually recovered after discontinuation

Stopping contraception

The FSRH have produced a useful table detailing how the different methods may be stopped. Please follow the link for the full table.

Method	Women < 50 years	Women ≥ 50 years
Non-hormonal (e.g. IUD, condoms, natural family planning)	Stop contraception after 2 years of amenorrhoea	Stop contraception after 1 year of amenorrhoea
COCP	Can be continued to 50 years	Switch to non-hormonal or progestogen-only method
Depo-Provera	Can be continued to 50 years	Switch to either a non-hormonal method and stop after 2 years of amenorrhoea OR switch to a progestogen-only method and follow advice below
Implant, POP, IUS	Can be continued beyond 50 years	Continue If amenorrhoeic check FSH and stop after 1 year if FSH ≥ 30u/l or stop at 55 years If not amenorrhoeic consider investigating abnormal bleeding pattern

Hormone Replacement Therapy and Contraception

As we know hormone replacement therapy (HRT) cannot be relied upon for contraception so a separate method of contraception is needed. The FSRH advises that the POP may be used with

in conjunction with HRT as long as the HRT has a progestogen component (i.e. the POP cannot be relied upon to 'protect' the endometrium). In contrast the IUS is licensed to provide the progestogen component of HRT.



Question 8 of 71

Next

A 29-year-old female presents to her GP as she missed her Micronor pill (progestogen only) this morning and is unsure what to do. She normally takes the pill at around 0830 and it is now 1100. What advice should be given?



- ☒ A. Take missed pill now and no further action needed
- ☐ B. Emergency contraception should be offered
- ☐ C. Take missed pill now and advise condom use until pill taking re-established for 48 hours
- ☐ D. Take missed pill now and omit pill break at end of pack
- ☐ E. Perform a pregnancy test

Next question

Progestogen only pill: missed pill

The missed pill rules for the progestogen only pill (POP) are simpler than those used for the combined oral contraceptive pill, but it is important not to confuse the two.

'Traditional' POPs (Micronor, Noriday, Norgeston, Femulen)	Cerazette (desogestrel)
<p>If less than 3 hours late</p> <ul style="list-style-type: none">no action required, continue as normal <p>If more than 3 hours late (i.e. more than 27 hours since the last pill was taken)</p>	<p>If less than 12 hours late</p> <ul style="list-style-type: none">no action required, continue as normal <p>If more than 12 hours late (i.e. more than 36 hours since the last pill was taken)</p>

'Traditional' POPs (Micronor, Noriday, Nogeston, Femulen)	Cerazette (desogestrel)
<ul style="list-style-type: none"> • action needed - see below 	<ul style="list-style-type: none"> • action needed - see below

Action required, if needed:

- take the missed pill as soon as possible. If more than one pill has been missed just take one pill. Take the next pill at the usual time, which may mean taking two pills in one day
- continue with rest of pack
- extra precautions (e.g. condoms) should be used until pill taking has been re-established for 48 hours



Question 9 of 71

Next

A 26-year-old woman presents to surgery requesting contraceptive advice. She has recently entered a new relationship and has only used condoms previously. There is no significant medical history of note although her body mass index (BMI) is 34 kg/m².

Which one of the following statements regarding her contraceptive options is correct?



- ☒ A. Desogestrel 75 mcg od would be a suitable choice
- ☐ B. There is no evidence that Depo-Provera would make her put on weight
- ☐ C. The combined oral contraceptive pill is absolutely contraindicated
- ☐ D. Intrauterine devices are contraindicated due to the increased risk of uterine perforation
- ☐ E. She should be advised to reduce her BMI to ≤ 30 kg/m² before using any hormonal methods due to the risk of venous thromboembolism

Next question

Contraception for obese patients: use of COCP may be limited but all other options are UKMEC 1

Depo-Provera is the only contraceptive option where there is robust evidence that it may cause weight gain.

There is no evidence that the dose of progestogen-only pills or other forms of contraception need to be adjusted for obese patients.

Contraception: obese patients

Obesity increases the risk of venous thromboembolism for women taking the COCP. For the COCP the following recommendations are made:

- UKMEC 2: BMI 30-34 kg/m²
- UKMEC 3: BMI \geq 35 kg/m²

All other methods of contraception have a UKMEC of 1.



Question 10 of 71

Next

A 33-year-old female presents to her GP as she missed her Noriday pill (progestogen only) this morning and is unsure what to do. She normally takes the pill at around 0900 and it is now 1230. What advice should be given?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Take missed pill as soon as possible and advise condom use until pill taking re-established for 48 hours |
| <input type="radio"/> | B. Take missed pill as soon as possible and omit pill break at end of pack |
| <input type="radio"/> | C. Perform a pregnancy test |
| <input type="radio"/> | D. Take missed pill as soon as possible and no further action needed |
| <input type="radio"/> | E. Emergency contraception should be offered |

Next question

The October 2011 AKT feedback stated: *'With regard to AKT 13, knowledge about basic contraceptive issues seemed to be lacking.'*

Progestogen only pill: missed pill

The missed pill rules for the progestogen only pill (POP) are simpler than those used for the combined oral contraceptive pill, but it is important not to confuse the two.

'Traditional' POPs (Micronor, Noriday, Nogeston, Femulen)	Cerazette (desogestrel)
<p>If less than 3 hours late</p> <ul style="list-style-type: none">no action required, continue as normal <p>If more than 3 hours late (i.e. more than 27 hours since the last pill was taken)</p> <ul style="list-style-type: none">action needed - see below	<p>If less than 12 hours late</p> <ul style="list-style-type: none">no action required, continue as normal <p>If more than 12 hours late (i.e. more than 36 hours since the last pill was taken)</p> <ul style="list-style-type: none">action needed - see below

Action required, if needed:

- take the missed pill as soon as possible. If more than one pill has been missed just take one pill. Take the next pill at the usual time, which may mean taking two pills in one day
- continue with rest of pack
- extra precautions (e.g. condoms) should be used until pill taking has been re-established for 48 hours



Question 11 of 71

Next

A 19-year-old female is prescribed a 7 day course of penicillin for tonsillitis. She is currently taking Microgynon 30. What is the most appropriate advice regarding contraception?

- ☐ A. Use condoms for 7 days only if antibiotic course overlaps with pill free interval
- ☐ B. Use condoms for 14 days

☒

C. There is no need for extra protection

☐

D. Use condoms for 21 days

☐

E. Use condoms for 7 days

Next question

The guidelines have changed. Please see below for more details.

Combined oral contraceptive pill: special situations

Concurrent antibiotic use

- for many years doctors in the UK have advised that the concurrent use of antibiotics may interfere with the enterohepatic circulation of oestrogen and thus make the combined oral contraceptive pill ineffective - 'extra- precautions' were advised for the duration of antibiotic treatment and for 7 days afterwards
- no such precautions are taken in the US or the majority of mainland Europe
- in 2011 the Faculty of Sexual & Reproductive Healthcare produced new guidelines abandoning this approach. The latest edition of the BNF has been updated in line with this guidance
- precautions should still be taken with enzyme inducing antibiotics such as rifampicin

Switching combined oral contraceptive pills

- the BNF and Faculty of Sexual & Reproductive Healthcare (FSRH) appear to give contradictory advice. The Clinical Effectiveness Unit of the FSRH have stated in the Combined Oral Contraception guidelines that the pill free interval does not need to be omitted (please see link). The BNF however advises missing the pill free interval if the progesterone changes. Given the uncertainty it is best to follow the BNF



Question 12 of 71

Next

A 19-year-old female is prescribed a 7 day course of amoxicillin for a lower respiratory tract infection. She is currently taking Cerazette (desogestrel). What is the most appropriate advice regarding contraception?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Use condoms for 14 days |
| <input type="radio"/> | B. Use condoms for 21 days |
| <input type="radio"/> | C. Use condoms for 7 days |
| <input checked="" type="radio"/> | D. There is no need for extra protections |
| <input type="radio"/> | E. Use condoms for 7 days, only antibiotic course overlaps with pill free interval |

Next question

Progestogen only pill + antibiotics - no need for extra precautions

Progestogen only pill: counselling

Women who are considering taking the progestogen only pill (POP) should be counselled in a number of areas:

Potential adverse effects

- irregular vaginal bleeding is the most common problem

Starting the POP

- if commenced up to and including day 5 of the cycle it provides immediate protection, otherwise additional contraceptive methods (e.g. Condoms) should be used for the first 2 days
- if switching from a combined oral contraceptive (COC) gives immediate protection if continued directly from the end of a pill packet (i.e. Day 21)

Taking the POP

- should be taken at same time everyday, without a pill free break (unlike the COC)

Missed pills

- if < 3 hours* late: continue as normal
- if > 3 hours*: take missed pill as soon as possible, continue with rest of pack, extra precautions (e.g. Condoms) should be used until pill taking has been re-established for 48 hours

Other potential problems

- diarrhoea and vomiting: continue taking POP but assume pills have been missed - see above
- antibiotics: have no effect on the POP**
- liver enzyme inducers may reduce effectiveness

Other information

- discussion on STIs

*for Cerazette (desogestrel) a 12 hour period is allowed

**unless the antibiotic alters the P450 enzyme system, for example rifampicin



Question 13 of 71

Next

What is the failure rate of male sterilisation?

<input type="radio"/>	A. 1 in 100
<input type="radio"/>	B. 1 in 200
<input type="radio"/>	C. 1 in 300
<input type="radio"/>	D. 1 in 400



E. 1 in 2,000

Next question

Male sterilisation - failure rate = 1 in 2,000

Sterilisation

Male sterilisation - vasectomy

- failure rate: 1 per 2,000*
- simple operation, can be done under LA (some GA), go home after a couple of hours
- doesn't work immediately
- semen analysis needs to be performed twice following a vasectomy before a man can have unprotected sex (usually at 16 and 20 weeks)
- complications: bruising, haematoma, infection, sperm granuloma, chronic testicular pain (affects between 5-30% men)
- the success rate of vasectomy reversal is up to 55%, if done within 10 years, and approximately 25% after more than 10 years

Female sterilisation

- failure rate: 1 per 200*
- usually done by laparoscopy under general anaesthetic
- generally done as a day case
- many different techniques involving clips (e.g. Filshie clips) , blockage, rings (Falope rings) and salpingectomy
- complications: increased risk of ectopic if sterilisation fails, general complications of GA/laparoscopy
- the current success rate of female sterilisation reversal is between 50-60%

*source = Royal College of Obstetricians and Gynaecologists



Question 14 of 71

Next

A 34-year-old female has a TT380 Slimline intrauterine device fitted for contraception on day 14 of her cycle. She has not been sexually active since her last period. How long will it take before it can be relied upon as a method of contraception?



- | | |
|----------------------------------|-----------------------------------|
| <input checked="" type="radio"/> | A. Immediately |
| <input type="radio"/> | B. 2 days |
| <input type="radio"/> | C. 5 days |
| <input type="radio"/> | D. 7 days |
| <input type="radio"/> | E. Until first day of next period |

Next question

Contraceptives - time until effective (if not first day period):

- instant: IUD
- 2 days: POP
- 7 days: COC, injection, implant, IUS

Intrauterine contraceptive devices

Intrauterine contraceptive devices comprise both conventional copper intrauterine devices (IUDs) and levonorgestrel-releasing intrauterine systems (IUS, Mirena). The IUS is also used in the management of menorrhagia

Effectiveness

- both the IUD and IUS are more than 99% effective

Mode of action

- IUD: primary mode of action is prevention of fertilisation by causing decreased sperm motility and survival (possibly an effect of copper ions)
- IUS: levonorgestrel prevents endometrial proliferation and causes cervical mucous thickening

Counselling

- IUD is effective immediately following insertion
- IUS can be relied upon after 7 days

Potential problems

- IUDs make periods heavier, longer and more painful
- the IUS is associated with initial frequent uterine bleeding and spotting. Later women typically have intermittent light menses with less dysmenorrhoea and some women become amenorrhoeic
- uterine perforation: up to 2 per 1000 insertions
- the proportion of pregnancies that are ectopic is increased but the absolute number of ectopic pregnancies is reduced, compared to a woman not using contraception
- infection: there is a small increased risk of pelvic inflammatory disease in the first 20 days after insertion but after this period the risk returns to that of a standard population
- expulsion: risk is around 1 in 20, and is most likely to occur in the first 3 months



Question 15 of 71

Next

A 23-year-old woman comes for contraceptive advice. Until now she has used condoms for contraception. She has recently started a relationship and wants a more reliable method of contraception. Her past medical history includes migraine and she is a non-smoker. Her migraine attacks happen about once every 2 months and are not associated with aura.

In keeping with Faculty of Sexual & Reproductive Healthcare (FSRH) guidelines, what is the most appropriate advice to give regarding the combined oral contraceptive pill (COCP)?

- | | |
|-----------------------|---|
| <input type="radio"/> | A. There is no limitation on the use of the COCP given the infrequency of the attacks |
| <input type="radio"/> | B. The COCP is absolutely contraindicated |

<input type="radio"/>	C. The COCP may only be considered if she is taking migraine prophylaxis
✓ <input checked="" type="radio"/>	D. The advantages outweigh the disadvantages
✗ <input type="radio"/>	E. The disadvantages outweigh the advantages and alternative methods should be used

Next question

This woman has migraines without aura. As she is initiating treatment she is therefore classed as UKMEC 2 for the combined oral contraceptive pill - advantages outweigh the disadvantages.

Combined oral contraceptive pill: comorbidities

Women who present for contraceptive advice are generally in good health. There are however a number of conditions which may affect the choice of contraceptive.

During this discussion reference will be made to the UKMEC recommendations on contraceptions made by the Faculty of Sexual and Reproductive Health (FSRH):

- UKMEC 2: advantages generally outweigh the disadvantages
- UKMEC 3: disadvantages generally outweigh the advantages
- UKMEC 4: represents an unacceptable health risk

Smoking

The FSRH make the following UKMEC recommendations with respect to the combined oral contraceptive pill (COCP) due to the increased risk of cardiovascular disease:

- UKMEC 2: age < 35 years
- UKMEC 3: age > 35 years and smoking < 15 cigarettes/day
- UKMEC 4: age > 35 years and smoking > 15 cigarettes/day

There is no increased risk of cardiovascular disease with progestogen-only contraceptives so they are classed as UKMEC 1, regardless of the patient's age/cigarette intake.

Obesity

Obesity increases the risk of venous thromboembolism for women taking the COCP. For the COCP the following recommendations are made:

- UKMEC 2: BMI 30-34 kg/m²
- UKMEC 3: BMI \geq 35 kg/m²

All other methods of contraception have a UKMEC of 1.

Migraine

The COCP is contraindicated (i.e. UKMEC 4) in patients with a history of migraine with aura. For patients who have migraines without aura the recommendation by the FSRH is that the COCP is UKMEC 3 for continued prescribing and UKMEC 2 for initiation. Progestogen only methods such as the progestogen-only pill (POP), implant and injection are UKMEC 2 and are hence better choices.

Epilepsy

There are a number of factors to consider for women with epilepsy:

- the effect of the contraceptive on the effectiveness of the anti-epileptic medication
- the effect of the anti-epileptic on the effectiveness of the contraceptive
- the potential teratogenic effects of the anti-epileptic if the woman becomes pregnant

Given the points above, the FSRH recommend the consistent use of condoms, in addition to other forms of contraception.

For women taking phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine:

- UKMEC 3: the COCP and POP
- UKMEC 2: implant
- UKMEC 1: Depo-Provera, IUD, IUS

For lamotrigine:

- UKMEC 3: the COCP
- UKMEC 1: POP, implant, Depo-Provera, IUD, IUS

If a COCP is chosen then it should contain a minimum of 30 μ g of ethinylestradiol.



Question 16 of 71

Next

A 19-year-old woman is seen the day after being discharged from hospital following a termination of pregnancy at 14 weeks. She is keen to start the combined oral contraceptive (COC) pill despite discussing long acting reversible contraceptives. What is the most appropriate action?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Start COC immediately |
| <input type="radio"/> | B. Start COC after 7 days |
| <input type="radio"/> | C. Refuse to prescribe a contraceptive unless she chooses a long acting reversible contraceptive |
| <input type="radio"/> | D. Start COC on first day of next period |
| <input checked="" type="radio"/> | E. Start COC after 21 days |

Next question

The COC can be started immediately after a miscarriage or abortion. Women are protected from pregnancy straight away.

Combined oral contraceptive pill: counselling

Women who are considering taking the combined oral contraceptive pill (COC) should be counselled in a number of areas:

Potential harms and benefits, including

- the COC is > 99% effective if taken correctly
- small risk of blood clots
- very small risk of heart attacks and strokes
- increased risk of breast cancer and cervical cancer

Advice on taking the pill, including

- if the COC is started within the first 5 days of the cycle then there is no need for additional contraception. If it is started at any other point in the cycle then alternative contraception should be used (e.g. condoms) for the first 7 days
- should be taken at the same time everyday

- taken for 21 days then stopped for 7 days - similar uterine bleeding to menstruation
- advice that intercourse during the pill-free period is only safe if the next pack is started on time

Discussion on situations here efficacy may be reduced*

- if vomiting within 2 hours of taking COC pill
- if taking liver enzyme inducing drugs

Other information

- discussion on STIs

*Concurrent antibiotic use

- for many years doctors in the UK have advised that the concurrent use of antibiotics may interfere with the enterohepatic circulation of oestrogen and thus make the combined oral contraceptive pill ineffective - 'extra-precautions' were advised for the duration of antibiotic treatment and for 7 days afterwards
- no such precautions are taken in the US or the majority of mainland Europe
- in 2011 the Faculty of Sexual & Reproductive Healthcare produced new guidelines abandoning this approach. The latest edition of the BNF has been updated in line with this guidance
- precautions should still be taken with enzyme inducing antibiotics such as rifampicin



Question 17 of 71

Next

Which one of the following statements regarding the lactational amenorrhoea method (LAM) of contraception post-partum is correct?

<input type="radio"/>	A. 1-2 top up feeds per day are allowed as long as this is in addition to breastfeeding
<input type="radio"/>	B. Is recommended for mothers with HIV
<input type="radio"/>	C. Should only be used if women decline long-acting reversible contraceptives

- | | |
|----------------------------------|---|
| <input type="radio"/> | D. Is 100% effective if the woman is amenorrhoeic |
| <input checked="" type="radio"/> | E. The effectiveness decreases after 6 months |

Next question

Post-partum contraception

After giving birth women require contraception after day 21.

Progestogen only pill (POP)

- the FSRH advise 'postpartum women (breastfeeding and non-breastfeeding) can start the POP at any time postpartum.'
- after day 21 additional contraception should be used for the first 2 days
- a small amount of progestogen enters breast milk but this is not harmful to the infant

Combined oral contraceptive pill (COC)

- absolutely contraindicated - UKMEC 4 - if breast feeding < 6 weeks post-partum
- relatively contraindicated - UKMEC 3 - if breast feeding 6 weeks - 6 months postpartum
- the COC may reduce breast milk production in lactating mothers
- may be started from day 21 - this will provide immediate contraception
- after day 21 additional contraception should be used for the first 7 days

Lactational amenorrhoea method (LAM)

- is 98% effective providing the woman is fully breast-feeding (no supplementary feeds), amenorrhoeic and < 6 months post-partum



Question 18 of 71

Next

You are discussing contraceptive choices with a 16-year-old girl. Which one of the following is the most suitable method to recommend for this age group?

<input type="radio"/>	A. Intra-uterine system (Mirena)
<input type="radio"/>	B. Progesterone-only injection (Depo-provera)
<input type="radio"/>	C. Withdrawal method
<input checked="" type="radio"/>	D. Progestogen-only implant (Nexplanon)
<input type="radio"/>	E. Intra-uterine device

Next question

Contraceptive Choices for Young People

The Faculty of Sexual and Reproductive Health (FRSH) produced guidelines in 2010 concerning the provision of contraception to young people. Much of the following is based on those guidelines. Please see the link for more details.

Legal and ethical issues

- the age of consent for sexual activity in the UK is 16 years. Practitioners may however provide advice and contraception if they feel that the young person is 'competent'. This is usually assessed using the Fraser guidelines (see below)
- children under the age of 13 years are considered unable to consent for sexual intercourse and hence consultations regarding this age group should automatically trigger child protection measures

The Fraser Guidelines state that all the following requirements should be fulfilled:

- the young person understands the professional's advice
- the young person cannot be persuaded to inform their parents
- the young person is likely to begin, or to continue having, sexual intercourse with or without contraceptive treatment
- unless the young person receives contraceptive treatment, their physical or mental health, or both, are likely to suffer
- the young person's best interests require them to receive contraceptive advice or treatment with or without parental consent

Sexual Transmitted Infections (STIs)

- young people should be advised to have STI tests 2 and 12 weeks after an incident of unprotected sexual intercourse (UPSI)

Choice of contraceptive

- clearly long-acting reversible contraceptive methods (LARCs) have advantages in young people as this age group may often be less reliable in remembering to take medication
- however, there are some concerns about the effect of progesterone-only injections (Depo-provera) on bone mineral density and the UKMEC category of the IUS and IUD is 2 for women under the age of 20 years, meaning they may not be the best choice
- the progesterone-only implant (Nexplanon) is therefore the LARC of choice in young people



Question 19 of 71

Next

A 21-year-old woman phones you for advice. She forgot to take her Microgynon 30 pill yesterday. Over the past two weeks she has been having regular intercourse with her boyfriend. She is 5 days into a new packet of pills and has not forgotten to take any of her other pills.

What is the most appropriate advice?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Take the missed pill as soon as possible, no additional measures needed |
| <input type="radio"/> | B. Take the missed pill as soon as possible, use condoms for the next 7 days |
| <input type="radio"/> | C. Take two pills every day for the next 7 days |
| <input type="radio"/> | D. Come in to arrange emergency contraception, no additional measures needed |
| <input type="radio"/> | E. Come in to arrange emergency contraception, use condoms for the next 7 days |

Next question

COCp: if 1 pill is missed, take the last pill ASAP but no further action is needed

As this patient has only missed 1 pill no further action is needed.

Combined oral contraceptive pill: missed pill

The advice from the Faculty of Sexual and Reproductive Healthcare (FSRH) has changed over recent years. The following recommendations are now made for women taken a combined oral contraceptive (COC) pill containing 30-35 micrograms of ethinylestradiol

If 1 pill is missed (at any time in the cycle)

- take the last pill even if it means taking two pills in one day and then continue taking pills daily, one each day
- no additional contraceptive protection needed

If 2 or more pills missed

- take the last pill even if it means taking two pills in one day, leave any earlier missed pills and then continue taking pills daily, one each day
- the women should use condoms or abstain from sex until she has taken pills for 7 days in a row. FSRH: *'This advice may be overcautious in the second and third weeks, but the advice is a backup in the event that further pills are missed'*
- if pills are missed in week 1 (Days 1-7): emergency contraception should be considered if she had unprotected sex in the pill-free interval or in week 1
- if pills are missed in week 2 (Days 8-14): after seven consecutive days of taking the COC there is no need for emergency contraception*
- if pills are missed in week 3 (Days 15-21): she should finish the pills in her current pack and start a new pack the next day; thus omitting the pill free interval

*theoretically women would be protected if they took the COC in a pattern of 7 days on, 7 days off



A 44-year-old female has a Mirena (intrauterine system) fitted for contraception on day 12 of her cycle. How long will it take before it can be relied upon as a method of contraception?

- ☐ A. Immediately
- ☐ B. 2 days
- ☐ C. 5 days
- ☒ D. 7 days
- ☐ E. Until first day of next period

Next question

Contraceptives - time until effective (if not first day period):

- instant: IUD
- 2 days: POP
- 7 days: COC, injection, implant, IUS

Intrauterine contraceptive devices

Intrauterine contraceptive devices comprise both conventional copper intrauterine devices (IUDs) and levonorgestrel-releasing intrauterine systems (IUS, Mirena). The IUS is also used in the management of menorrhagia

Effectiveness

- both the IUD and IUS are more than 99% effective

Mode of action

- IUD: primary mode of action is prevention of fertilisation by causing decreased sperm motility and survival (possibly an effect of copper ions)

- IUS: levonorgestrel prevents endometrial proliferation and causes cervical mucous thickening

Counselling

- IUD is effective immediately following insertion
- IUS can be relied upon after 7 days

Potential problems

- IUDs make periods heavier, longer and more painful
- the IUS is associated with initial frequent uterine bleeding and spotting. Later women typically have intermittent light menses with less dysmenorrhoea and some women become amenorrhoeic
- uterine perforation: up to 2 per 1000 insertions
- the proportion of pregnancies that are ectopic is increased but the absolute number of ectopic pregnancies is reduced, compared to a woman not using contraception
- infection: there is a small increased risk of pelvic inflammatory disease in the first 20 days after insertion but after this period the risk returns to that of a standard population
- expulsion: risk is around 1 in 20, and is most likely to occur in the first 3 months



Question 21 of 71

Next

What is the failure rate of female sterilisation?



- | | |
|----------------------------------|-------------|
| <input type="radio"/> | A. 1 in 100 |
| <input checked="" type="radio"/> | B. 1 in 200 |
| <input type="radio"/> | C. 1 in 300 |
| <input type="radio"/> | D. 1 in 400 |
| <input type="radio"/> | E. 1 in 500 |

Next question

Female sterilisation - failure rate = 1 in 200

Sterilisation

Male sterilisation - vasectomy

- failure rate: 1 per 2,000*
- simple operation, can be done under LA (some GA), go home after a couple of hours
- doesn't work immediately
- semen analysis needs to be performed twice following a vasectomy before a man can have unprotected sex (usually at 16 and 20 weeks)
- complications: bruising, haematoma, infection, sperm granuloma, chronic testicular pain (affects between 5-30% men)
- the success rate of vasectomy reversal is up to 55%, if done within 10 years, and approximately 25% after more than 10 years

Female sterilisation

- failure rate: 1 per 200*
- usually done by laparoscopy under general anaesthetic
- generally done as a day case
- many different techniques involving clips (e.g. Filshie clips) , blockage, rings (Falope rings) and salpingectomy
- complications: increased risk of ectopic if sterilisation fails, general complications of GA/laparoscopy
- the current success rate of female sterilisation reversal is between 50-60%

*source = Royal College of Obstetricians and Gynaecologists



Question 1 of 136

Next

You are reviewing the blood results of a 45-year-old obese man who had been complaining of tiredness. His full blood count, urea and electrolytes and thyroid function tests were within normal limits. The fasting plasma glucose result is shown below:

Fasting plasma glucose 6.2 mmol/l

What is the most appropriate interpretation of this result?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Consistent with diabetes mellitus - need to confirm with a repeat sample |
| <input checked="" type="radio"/> | B. Normal - no further action needed |
| <input type="radio"/> | C. Borderline - repeat sample in 12 months |
| <input type="radio"/> | D. Impaired glucose tolerance - moderate risk of developing type 2 diabetes mellitus |
| <input checked="" type="radio"/> | E. Prediabetes - high risk of developing type 2 diabetes mellitus |

Next question

This patient has impaired fasting glycaemia is diagnosed with a fasting plasma glucose (FPG) between 6.1-6.9 mmol/l and he should therefore be managed as having prediabetes.

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



A 64-year-old man is reviewed in clinic. He has a history of ischaemic heart disease and was diagnosed with type 2 diabetes mellitus around 12 months ago. At this time of diagnosis his HbA1c was 7.6% (60 mmol/mol) and he was started on metformin which was titrated up to a dose of 1g bd. The most recent bloods show a HbA1c of 6.8% (51 mmol/mol). He has just retired from working in the IT industry and his body mass index (BMI) today is 28 kg/m². His other medication is as follows:

Atorvastatin 80mg on
Aspirin 75mg od
Bisoprolol 2.5 mg od
Ramipril 5mg od

What is the most appropriate next step?

- | | |
|----------------------------------|--------------------------------------|
| <input type="radio"/> | A. Add sitagliptin |
| <input type="radio"/> | B. Make no changes to his medication |
| <input checked="" type="radio"/> | C. Add glimepiride |
| <input type="radio"/> | D. Add pioglitazone |
| <input type="radio"/> | E. Add exenatide |

Next question

NICE recommend we add another drug if the HbA1c is $\geq 6.5\%$ at this stage. This is no reason in the history not to add a sulfonylurea.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes

- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



Question 3 of 136

Next

A 23-year-old woman presents with sweating and tremor. Her thyroid function tests are as follows:

TSH	<0.05 mU/l
Free T4	25 pmol/l

What is the most common cause this presentation?



- ☐ A. Hashimoto's thyroiditis
- ☒ B. Graves' disease
- ☐ C. Toxic nodular goitre
- ☐ D. De Quervain's thyroiditis
- ☐ E. Toxic adenoma

Next question

Graves' disease is the most common cause of thyrotoxicosis in the UK. All the other conditions can cause thyrotoxicosis but are less common.

Thyrotoxicosis

Graves' disease accounts for around 50-60% of cases of thyrotoxicosis.

Causes

- Graves' disease
- toxic nodular goitre
- subacute (de Quervain's) thyroiditis
- post-partum thyroiditis
- acute phase of Hashimoto's thyroiditis (later results in hypothyroidism)
- toxic adenoma (Plummer's disease)
- amiodarone therapy

Investigation

- TSH down, T4 and T3 up
- thyroid autoantibodies
- other investigations are not routinely done but includes isotope scanning



Question 4 of 136

Next

A 33-year-old woman presents with weight loss and excessive sweating. her partner reports that she is 'on edge' all the time and during the consultation you notice a fine tremor. Her pulse rate is 96/min. A large, non-tender goitre is noted. Examination of her eyes is unremarkable with no evidence of exophthalmos.

Free T4	26 pmol/l
Free T3	12.2 pmol/l (3.0-7.5)
TSH	< 0.05 mu/l

What is the most likely diagnosis?

- ☐ A. Toxic multinodular goitre
- ☐ B. Hashimoto's thyroiditis

- | | |
|----------------------------------|------------------------------|
| <input type="radio"/> | C. T3-secreting adenoma |
| <input type="radio"/> | D. De Quervain's thyroiditis |
| <input checked="" type="radio"/> | E. Graves' disease |

[Next question](#)

Graves' disease is the most common cause of thyrotoxicosis

Only around 30% of patients with Graves' disease have eye disease so the absence of eye signs does not exclude the diagnosis.

Graves' disease: features

Graves' disease is the most common cause of thyrotoxicosis. It is typically seen in women aged 30-50 years.

Features

- typical features of thyrotoxicosis
- specific signs limited to Grave's (see below)

Features seen in Graves' but not in other causes of thyrotoxicosis

- eye signs (30% of patients): exophthalmos, ophthalmoplegia
- pretibial myxoedema
- thyroid acropachy

Autoantibodies

- anti-TSH receptor stimulating antibodies (90%)
- anti-thyroid peroxidase antibodies (50%)



A 46-year-old man with suspected diabetes mellitus has an oral glucose tolerance test, following the standard WHO protocol. The following results are obtained:

Time (hours)	Blood glucose (mmol/l)
0	5.7
2	7.6

How should these results be interpreted?



- ☒ A. Normal
- ☐ B. Impaired fasting glucose and impaired glucose tolerance
- ☐ C. Diabetes mellitus
- ☐ D. Impaired glucose tolerance
- ☐ E. Impaired fasting glucose

Next question

Both the fasting and two-hour glucose are within normal limits.

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



Question 6 of 136

Next

A 60-year-old man who has type 1 diabetes mellitus complains of reduced hypoglycaemic awareness. This has been a problem since he was discharged from hospital a few weeks ago.

During his admission a number of new medications were started. Which one of the following is most likely to be responsible?

- | | | |
|---|----------------------------------|---------------------------|
|  | <input type="radio"/> | A. Clopidogrel |
| | <input type="radio"/> | B. Bendroflumethiazide |
|  | <input checked="" type="radio"/> | C. Atenolol |
| | <input type="radio"/> | D. Simvastatin |
| | <input type="radio"/> | E. Isosorbide mononitrate |

[Next question](#)

Insulin therapy: side-effects

Hypoglycaemia

- patients should be taught the signs of hypoglycaemia: sweating, anxiety, blurred vision, confusion, aggression
- conscious patients should take 10-20g of a short-acting carbohydrate (e.g. a glass of Lucozade or non-diet drink, three or more glucose tablets, glucose gel)
- every person treated with insulin should have a glucagon kit for emergencies where the patient is not able to orally ingest a short-acting carbohydrate
- patients who have frequent hypoglycaemic episodes may develop reduced awareness. If this develops then allowing glycaemic control to slip for a period of time may restore their awareness
- beta-blockers reduce hypoglycaemic awareness

Lipodystrophy

- typically presents as atrophy of the subcutaneous fat
- can be prevented by rotating the injection site



Question 7 of 136

Next

You are reviewing the blood results of a 67-year-old man who has recently been diagnosed as having hypertension. A HbA1c level was requested as part of the routine work-up. Which one of the following HbA1c ranges is most consistent with a diagnosis of prediabetes?

- ☐ A. 31-36 mmol/mol (5.0-5.4%)
- ☒ B. 37-41 mmol/mol (5.5-5.9%)
- ☒ C. 42-47 mmol/mol (6.0-6.4%)
- ☐ D. 48-52 mmol/mol (6.5-6.9%)
- ☐ E. 53-58 mmol/mol (7.0-7.5%)

Next question

Prediabetes is defined by a HbA1c of 42-47 mmol/mol (6.0-6.4%)

Prediabetes and impaired glucose regulation

Prediabetes is a term which is increasingly used where there is impaired glucose levels which are above the normal range but not high enough for a diagnosis of diabetes mellitus. The term includes patients who have been labelled as having either impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Diabetes UK estimate that around 1 in 7 adults in the UK have prediabetes. Many individuals with prediabetes will progress on to developing type 2 diabetes mellitus (T2DM) and they are therefore at greater risk of microvascular and macrovascular complications.

Terminology

- Diabetes UK currently recommend using the term prediabetes when talking to patients and impaired glucose regulation when talking to other healthcare professionals
- research has shown that the term 'prediabetes' has the most impact and is most easily understood

Identification of patients with prediabetes

- NICE recommend using a validated computer based risk assessment tool for all adults aged 40 and over, people of South Asian and Chinese descent aged 25-39, and adults with conditions that increase the risk of type 2 diabetes
- patients identified at high risk should have a blood sample taken
- a fasting plasma glucose of 5.5-6.9 mmol/l or an HbA1c level of 42-47 mmol/mol (6.0-6.4%) indicates high risk

Management

- lifestyle modification: weight loss, increased exercise, change in diet
- at least yearly follow-up with blood tests is recommended
- NICE recommend metformin for adults at high risk *'whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme'*

Impaired fasting glucose and impaired glucose tolerance

There are two main types of IGR:

- impaired fasting glucose (IFG) - due to hepatic insulin resistance
- impaired glucose tolerance (IGT) - due to muscle insulin resistance
- patients with IGT are more likely to develop T2DM and cardiovascular disease than patients with IFG

Definitions

- a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)
- impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l
- people with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT



A 79-year-old woman presents after having a fall. During the consultation she complains of feeling cold all the time. Thyroid function tests (TFTs) are therefore ordered:

Free T4	7.1 pmol/l
TSH	14.3 mu/l

What is the most appropriate action?

- ☐ A. Repeat TFTs in 3 months
- ☒ B. Start levothyroxine 25mcg od
- ☐ C. Start levothyroxine 50mcg od
- ☐ D. Start levothyroxine 100mcg od
- ☐ E. Start carbimazole 10mg od

Next question

This lady has hypothyroidism as evidenced by the low free T4 and raised TSH. Given her age levothyroxine should be introduced slowly starting with a dose of 25mcg od.

Hypothyroidism: management

Key points

- initial starting dose of levothyroxine should be lower in elderly patients and those with ischaemic heart disease. The BNF recommends that for patients with cardiac disease, severe hypothyroidism or patients over 50 years the initial starting dose should be 25mcg od with dose slowly titrated. Other patients should be started on a dose of 50-100mcg od
- following a change in thyroxine dose thyroid function tests should be checked after 8-12 weeks
- the therapeutic goal is 'normalisation' of the thyroid stimulating hormone (TSH) level. As the majority of unaffected people have a TSH value 0.5-2.5 mU/l it is now thought preferable to aim for a TSH in this range
- there is no evidence to support combination therapy with levothyroxine and liothyronine

Side-effects of thyroxine therapy

- hyperthyroidism: due to over treatment
- reduced bone mineral density
- worsening of angina
- atrial fibrillation

Interactions

- iron: absorption of levothyroxine reduced, give at least 2 hours apart



Question 9 of 136

Next

A 72-year-old woman presents with polyuria and polydipsia. Investigations reveal the following:

Fasting glucose	4.5 mmol/l
Calcium	2.88 mmol/l
Phosphate	0.75 mmol/l
Parathyroid hormone	6 pmol/L (normal range = 0.8 - 8.5)

What is the most likely underlying diagnosis?



- ☐ A. Myeloma
- ☐ B. Sarcoidosis
- ☒ C. Primary hyperparathyroidism
- ☐ D. Vitamin D excess
- ☐ E. Osteomalacia

Next question

The PTH level in primary hyperparathyroidism may be normal

Despite a raised calcium level the parathyroid hormone level is inappropriately normal. This points towards a diagnosis of primary hyperparathyroidism and the other causes (such as myeloma) would lead to a suppression of parathyroid hormone

Primary hyperparathyroidism

In exams primary hyperparathyroidism is stereotypically seen in elderly females with an unquenchable thirst and an inappropriately normal or raised parathyroid hormone level. It is most commonly due to a solitary adenoma

Causes of primary hyperparathyroidism

- 80%: solitary adenoma
- 15%: hyperplasia
- 4%: multiple adenoma
- 1%: carcinoma

Features - 'bones, stones, abdominal groans and psychic moans'

- polydipsia, polyuria
- peptic ulceration/constipation/pancreatitis
- bone pain/fracture
- renal stones
- depression
- hypertension

Associations

- hypertension
- multiple endocrine neoplasia: MEN I and II

Investigations

- raised calcium, low phosphate
- PTH may be raised or normal
- technetium-MIBI subtraction scan

Treatment

- total parathyroidectomy



Question 10 of 136

Next

You go on a home visit to see a 78-year-old nursing home resident who was found 'collapsed' in his room earlier today. The paramedics were called and made a diagnosis of hypoglycaemia. The record of their visit shows that he was drowsy and the blood glucose was 1.8 mmol/l. After giving him an oral glucose paste the patient's condition significantly improved. A carer from the nursing home is present and reports that he has had regular 'hypos' recently.

His current medication is as follows:

Metformin 1g bd
Gliclazide 160mg od
Pioglitazone 45mg od
Aspirin 75mg od
Simvastatin 40mg on

What is the most appropriate immediate action?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Stop metformin |
| <input type="radio"/> | B. Stop pioglitazone |
| <input checked="" type="radio"/> | C. Stop gliclazide |
| <input type="radio"/> | D. Make no changes to the medication |
| <input type="radio"/> | E. Stop all oral antidiabetic medications |

Next question

Neither metformin nor pioglitazone cause hypoglycaemia. The gliclazide dose is therefore responsible and should be stopped in the short term before making longer term changes to his medication.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin

- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem ($\text{BMI} > 35 \text{ kg/m}^2$) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss $> 3\%$ at 6 months)

Starting insulin

- usually commenced if HbA1c $> 58 \text{ mmol/mol}$ (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk $> 10\%$ (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 40-year-old woman is diagnosed as having Addison's disease. What combination of medications is she most likely to be prescribed?



<input type="radio"/>	A. Prednisolone + fludrocortisone
<input checked="" type="radio"/>	B. Hydrocortisone + fludrocortisone
<input type="radio"/>	C. Hydrocortisone + dehydroepiandrosterone (DHEA)

- | | |
|-----------------------|--|
| <input type="radio"/> | D. Prednisolone + spironolactone |
| <input type="radio"/> | E. Hydrocortisone + oestrogen/progesterone |

Next question

Addison's disease management - hydrocortisone + fludrocortisone

Addison's disease: management

Patients who have Addison's disease are usually given both glucocorticoid and mineralocorticoid replacement therapy.

This usually means that patients take a combination of:

- hydrocortisone: usually given in 2 or 3 divided doses. Patients typically require 20-30 mg per day, with the majority given in the morning dose
- fludrocortisone

Patient education is important:

- emphasise the importance of not missing glucocorticoid doses
- consider MedicAlert bracelets and steroid cards
- discuss how to adjust the glucocorticoid dose during an intercurrent illness (see below)

Management of intercurrent illness

- in simple terms the glucocorticoid dose should be doubled
- the Addison's Clinical Advisory Panel have produced guidelines detailing particular scenarios - please see the CKS link for more details



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Next

A 43-year-old man is presents to surgery with a productive cough. On examination he is pyrexial and has bronchial breathing in the right lower zone. You make a working diagnosis of pneumonia and prescribe amoxicillin with a chest x-ray the next day. His past medical history includes Addison's disease for which he takes hydrocortisone (20mg in the mornings and 10mg in the afternoon). What is the most appropriate action with respect to his steroid dose?

- ☒ A. Continue to take the same dose
- ☒ B. Double hydrocortisone to 40mg mornings and 20mg afternoon
- ☐ C. Halve hydrocortisone to 10mg mornings and 5mg afternoon
- ☐ D. Continue to take the same dose + prescribe a proton pump inhibitor
- ☐ E. Continue the same morning dose + stop the afternoon dose

Next question

Patients on long-term steroids should have their doses doubled during intercurrent illness

Corticosteroids

Corticosteroids are amongst the most commonly prescribed therapies in clinical practice. They are used both systemically (oral or intravenous) or locally (skin creams, inhalers, eye drops, intra-articular). They augment and in some cases replace the natural glucocorticoid and mineralocorticoid activity of endogenous steroids.

The relative glucocorticoid and mineralocorticoid activity of commonly used steroids is shown below:

Minimal glucocorticoid activity, very high mineralocorticoid activity,	Glucocorticoid activity, high mineralocorticoid activity,	Predominant glucocorticoid activity, low mineralocorticoid activity	Very high glucocorticoid activity, minimal mineralocorticoid activity
Fludrocortisone	Hydrocortisone	Prednisolone	Dexamethasone Betmethasone

Side-effects

The side-effects of corticosteroids are numerous and represent the single greatest limitation on their usage. Side-effects are more common with systemic and prolonged therapy.

Glucocorticoid side-effects

- endocrine: impaired glucose regulation, increased appetite/weight gain, hirsutism, hyperlipidaemia
- Cushing's syndrome: moon face, buffalo hump, striae
- musculoskeletal: osteoporosis, proximal myopathy, avascular necrosis of the femoral head
- immunosuppression: increased susceptibility to severe infection, reactivation of tuberculosis
- psychiatric: insomnia, mania, depression, psychosis
- gastrointestinal: peptic ulceration, acute pancreatitis
- ophthalmic: glaucoma, cataracts
- suppression of growth in children
- intracranial hypertension

Mineralocorticoid side-effects

- fluid retention
- hypertension

Selected points on the use of corticosteroids:



- patients on long-term steroids should have their doses doubled during intercurrent illness
- the BNF suggests gradual withdrawal of systemic corticosteroids if patients have: received more than 40mg prednisolone daily for more than one week, received more than 3 weeks treatment or recently received repeated courses



A 48-year-old man who was diagnosed with type 2 diabetes mellitus presents for review. During his annual review he was noted to have the following results:

Total cholesterol	5.3 mmol/l
HDL cholesterol	1.0 mmol/l
LDL cholesterol	3.1 mmol/l
Triglyceride	1.7 mmol/l
HbA1c	6.4%

A QRISK2 score is calculated showing that he has a 12% 10-year risk of developing cardiovascular disease. His current medication is metformin 500mg tds. According to recent NICE guidelines, what is the most appropriate action?

-  ☐ A. Simvastatin 40mg on
- ☐ B. Lifestyle advice, repeat lipid profile in 3 months
- ☐ C. Atorvastatin 40mg on
-  ☒ D. Atorvastatin 20mg on
- ☐ E. Increase his metformin slowly to 1g tds

Next question

NICE recommend the following when considering the use of statins in patients with type 2 diabetes mellitus:

Offer atorvastatin 20 mg for the primary prevention of CVD to people with type 2 diabetes who have a 10% or greater 10-year risk of developing CVD.

The April 2010 AKT feedback report stated: 'Items concerning routine management of type 2 diabetes caused some problem, especially with regard to the wider management of cardiovascular risks.'

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the

age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics
- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a

first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
 - → have established nephropathy or
 - → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



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Next

A 68-year-old woman is found to have the following blood tests:

TSH	0.05 mu/l
Free T4	19 pmol/l (range 9-25 pmol/l)
Free T3	7 pmol/l (range 3-9 pmol/l)

If left untreated, what are the most likely possible consequences?



- ☒ A. Supraventricular arrhythmias and osteoporosis
- ☐ B. Supraventricular arrhythmias and hyperlipidaemia
- ☐ C. Hypothyroidism and impaired glucose tolerance
- ☐ D. Myasthenia gravis and hypothyroidism
- ☐ E. Impaired glucose tolerance and hyperlipidaemia

Next question

Subclinical hyperthyroidism

Subclinical hyperthyroidism is an entity which is gaining increasing recognition. It is defined as:

- normal serum free thyroxine and triiodothyronine levels
- with a thyroid stimulating hormone (TSH) below normal range (usually $< 0.1 \text{ mU/l}$)

Causes

- multinodular goitre, particularly in elderly females
- excessive thyroxine may give a similar biochemical picture

The importance in recognising subclinical hyperthyroidism lies in the potential effect on the cardiovascular system (atrial fibrillation) and bone metabolism (osteoporosis). It may also impact on quality of life and increase the likelihood of dementia

Management



- TSH levels often revert to normal - therefore levels must be persistently low to warrant intervention
- a reasonable treatment option is a therapeutic trial of low-dose antithyroid agents for approximately 6 months in an effort to induce a remission



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Next

A 67-year-old man with a history of type 2 diabetes mellitus and hypertension is seen for his annual review. You note from his records that he is known to have diabetic maculopathy. He currently takes a combination of metformin, gliclazide, atorvastatin, amlodipine and ramipril. His most recent HbA1c is 57 mmol/mol (7.4%). Urine dipstick is normal. Blood pressure today in clinic is 144/88 mmHg. What should his target blood pressure be?

	<input type="radio"/>	A. < 140/90 mmHg
	<input type="radio"/>	B. < 130/90 mmHg
	<input checked="" type="radio"/>	C. < 130/80 mmHg
	<input type="radio"/>	D. < 140/80 mmHg
	<input type="radio"/>	E. < 120/80 mmHg

Next question

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

This patient has some evidence of diabetic complications (maculopathy) so his target should be < 130/80 mmHg.

Diabetes mellitus: hypertension management

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

A 2013 Cochrane review casted doubt on the wisdom of lower blood pressure targets for patients with diabetes. It compared patients who had tight blood pressure control (targets < 130/85 mmHg) with more relaxed control (< 140-160/90-100 mmHg). Patients who were more tightly controlled had a slightly reduced rate of stroke but otherwise outcomes were not significantly different.

Because ACE-inhibitors have a renoprotective effect in diabetes they are the first-line antihypertensives recommended for NICE. Patients of African or Caribbean family origin should be offered an ACE-inhibitor plus either a thiazide diuretic or calcium channel blocker. Further management then reverts to that of non-diabetic patients, as discussed earlier in the module.

Remember that autonomic neuropathy may result in more postural symptoms in patients taking

antihypertensive therapy.

The routine use of beta-blockers in uncomplicated hypertension should be avoided, particularly when given in combination with thiazides, as they may cause insulin resistance, impair insulin secretion and alter the autonomic response to hypoglycaemia.



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Next

Please look at this photo of a woman:



© Image used on license from [DermNet NZ](#)



Which one of the following is most associated with this appearance?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Cushing's syndrome |
| <input type="radio"/> | B. Acromegaly |
| <input type="radio"/> | C. Conn's syndrome |
| <input type="radio"/> | D. Using a second generation combined oral contraceptive pill |



E. Anorexia

[Next question](#)

Hirsutism and hypertrichosis

/hirsutism is often used to describe androgen-dependent hair growth in women, with hypertrichosis being used for androgen-independent hair growth

Polycystic ovarian syndrome is the most common causes of hirsutism. Other causes include:

- Cushing's syndrome
- congenital adrenal hyperplasia
- androgen therapy
- obesity: due to peripheral conversion oestrogens to androgens
- adrenal tumour
- androgen secreting ovarian tumour
- drugs: phenytoin

Assessment of hirsutism

- Ferriman-Gallwey scoring system: 9 body areas are assigned a score of 0 - 4, a score > 15 is considered to indicate moderate or severe hirsutism

Management of hirsutism

- advise weight loss if overweight
- cosmetic techniques such as waxing/bleaching - not available on the NHS
- consider using combined oral contraceptive pills such as co-cyprindiol (Dianette) or ethinylestradiol and drospirenone (Yasmin). Co-cyprindiol should not be used long-term due to the increased risk of venous thromboembolism
- facial hirsutism: topical eflornithine - contraindicated in pregnancy and breast-feeding

Causes of hypertrichosis

- drugs: minoxidil, ciclosporin, diazoxide
- congenital hypertrichosis lanuginosa, congenital hypertrichosis terminalis

- porphyria cutanea tarda
- anorexia nervosa



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Next

A 64-year-old man with type 2 diabetes mellitus is reviewed. He is currently prescribed metformin and also takes aspirin and simvastatin. There has been no change to his medication for the past 18 months. According to recent NICE guidelines, how often should his HbA1c be checked?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. 3 monthly |
| <input checked="" type="radio"/> | B. 6 monthly |
| <input type="radio"/> | C. Once a year |
| <input type="radio"/> | D. Every 2 years |
| <input type="radio"/> | E. Only if new problems develop |

Next question

NICE recommend checking the HbA1c every 6 months once treatment is stable in type 2 diabetes mellitus

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake

- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis

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Next

Theme: Side-effects of diabetes mellitus drugs

- | | |
|----|--------------|
| A. | Metformin |
| B. | Acarbose |
| C. | Glimepiride |
| D. | Nateglinide |
| E. | Pioglitazone |
| F. | Diazoxide |
| G. | Repaglinide |

Select the drug most likely to cause each one of the following side-effects

18. Syndrome of inappropriate ADH secretion

 You answered Repaglinide

The correct answer is Glimepiride

19. Lactic acidosis

✓ Metformin

20. Fluid retention

✓ Pioglitazone

Next question

Side-effects of common drugs: diabetes drugs

The table below summarises characteristic (if not necessarily the most common) side-effects of drugs used to treat diabetes mellitus

Drug	Side-effect
Metformin	<ul style="list-style-type: none">❖ Gastrointestinal side-effects❖ Lactic acidosis
Sulfonylureas	<ul style="list-style-type: none">❖ Hypoglycaemic episodes❖ Increased appetite and weight gain❖ Syndrome of inappropriate ADH secretion❖ Liver dysfunction (cholestatic)
Glitazones	<ul style="list-style-type: none">❖ Weight gain❖ Fluid retention❖ Liver dysfunction❖ Fractures

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Next

Theme: Diabetes mellitus: management of type 2

A. < 130/80 mmHg

B.	< 125/75 mmHg
C.	< 120/70 mmHg
D.	6.5% (48 mmol/mol)
E.	6.0% (42 mmol/mol)
F.	6.2% (44 mmol/mol)
G.	Aspirin
H.	Statin
I.	Ramipril
J.	No additional treatment

For each one of the following select the most appropriate answer

- 21.** A 43-year-old man with type 2 diabetes mellitus is reviewed. His HbA1c is 6.6% (49 mmol/mol) on metformin therapy. His blood pressure is 128/78 mmHg, he is a non-smoker and is not overweight. There is no family history of note. What addition, if any, should be made to his medication?

 You answered < 130/80 mmHg

The correct answer is No additional treatment

Following the recent NICE type 2 diabetes mellitus guidelines such lower risk patients do not automatically need to be offered a statin, even if they are over the age of 40 years.


Aspirin should be given to all type 2 diabetic patients > 50 years and to younger patients with other significant risk factors.

- 22.** The general HbA1c target (NICE) for patients with type 2 diabetes mellitus

 You answered < 130/80 mmHg

The correct answer is 6.5% (48 mmol/mol)

- 23.** The target blood pressure (NICE) for a 60-year-old man with type 2 diabetes mellitus and diabetic nephropathy

 < 130/80 mmHg

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)

- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 49-year-old woman with type 2 diabetes mellitus is being considered for exenatide therapy. Which one of the following is not part of the NICE criteria for starting or continuing this drug?



A. BMI > 35 kg/m²

- | | | |
|------------------------------------|----|--|
| <input type="radio"/> | B. | Greater than 1.0 percentage point HbA1c reduction after 6 months |
| ✓ <input checked="" type="radio"/> | C. | Has failed with insulin therapy |
| <input type="radio"/> | D. | Has type 2 diabetes mellitus |
| <input type="radio"/> | E. | Weight loss > 3% at 6 months |

Next question

Patients do not need to have been on insulin prior to using exenatide

Diabetes mellitus: GLP-1 and the new drugs

A number of new drugs to treat diabetes mellitus have become available in recent years. Much research has focused around the role of glucagon-like peptide-1 (GLP-1), a hormone released by the small intestine in response to an oral glucose load

Whilst it is well known that insulin resistance and insufficient B-cell compensation occur other effects are also seen in type 2 diabetes mellitus (T2DM). In normal physiology an oral glucose load results in a greater release of insulin than if the same load is given intravenously - this known as the incretin effect. This effect is largely mediated by GLP-1 and is known to be decreased in T2DM.

Increasing GLP-1 levels, either by the administration of an analogue (glucagon-like peptide-1, GLP-1 mimetics, e.g. exenatide) or inhibiting its breakdown (dipeptidyl peptidase-4 ,DPP-4 inhibitors - the gliptins), is therefore the target of two recent classes of drug.

Glucagon-like peptide-1 (GLP-1) mimetics (e.g. exenatide)

Exenatide is an example of a glucagon-like peptide-1 (GLP-1) mimetic. These drugs increase insulin secretion and inhibit glucagon secretion. One of the major advances of GLP-1 mimetics is that they typically result in weight loss, in contrast to many medications such as insulin, sulfonylureas and thiazolidinediones.

Exenatide must be given by subcutaneous injection within 60 minutes before the morning and evening meals. It should not be given after a meal.

Liraglutide is the other GLP-1 mimetic currently available. One the main advantages of liraglutide over exenatide is that it only needs to be given once a day.

Both exenatide and liraglutide may be combined with metformin and a sulfonylurea. Standard release exenatide is also licensed to be used with basal insulin alone or with metformin. Please see the BNF for a more complete list of licensed indications.

NICE state the following:

Consider adding exenatide to metformin and a sulfonylurea if:

- *BMI ≥ 35 kg/m² in people of European descent and there are problems associated with high weight, or*
- *BMI < 35 kg/m² and insulin is unacceptable because of occupational implications or weight loss would benefit other comorbidities.*

NICE like patients to have achieved a 1% reduction in HbA1c and 3% weight loss after 6 months to justify the ongoing prescription of GLP-1 mimetics.

The major adverse effect of GLP-1 mimetics is nausea and vomiting. The Medicines and Healthcare products Regulatory Agency has issued specific warnings on the use of exenatide, reporting that is has been linked to severe pancreatitis in some patients.

Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. Vildagliptin, sitagliptin)

Key points

- oral preparation
- trials to date show that the drugs are relatively well tolerated with no increased incidence of hypoglycaemia
- do not cause weight gain

NICE guidelines on DPP-4 inhibitors

- continue DPP-4 inhibitor only if there is a reduction of > 0.5 percentage points in HbA1c in 6 months
- NICE suggest that a DPP-4 inhibitor might be preferable to a thiazolidinedione if further weight gain would cause significant problems, a thiazolidinedione is contraindicated or the person has had a poor response to a thiazolidinedione



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Next

You review a 68-year-old man who has type 2 diabetes mellitus. He was noted during recent retinal screening to have pre-proliferative changes in his right eye but is otherwise well with no history of cardiovascular disease. Following NICE guidelines, what should his target blood pressure be?

- | | |
|----------------------------------|--------------------|
| <input type="radio"/> | A. < 120 / 70 mmHg |
| <input type="radio"/> | B. < 125 / 70 mmHg |
| <input type="radio"/> | C. < 125 / 75 mmHg |
| <input checked="" type="radio"/> | D. < 130 / 75 mmHg |
| <input checked="" type="radio"/> | E. < 130 / 80 mmHg |

Next question

Type 2 diabetes blood pressure target

- no organ damage: < 140 / 80
- end-organ damage: < 130 / 80

The April 2010 AKT feedback report stated: 'Items concerning routine management of type 2 diabetes caused some problem, especially with regard to the wider management of cardiovascular risks.'

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids

- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
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- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

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- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 54-year-old obese man presents with lethargy and polyuria. A fasting blood sugar is requested:

Fasting glucose	8.4 mmol/l
-----------------	------------

He is given dietary advice and a decision is made to start metformin. What is the most appropriate prescription?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Metformin 500mg od with food for 5 days then metformin 500mg bd for 5 days then metformin 500mg tds for 20 days then review |
| <input type="radio"/> | B. Metformin 500mg tds with food |
| <input checked="" type="radio"/> | C. Metformin 500mg od with food for 14 days then metformin 500mg bd for 14 days then review |
| <input type="radio"/> | D. Metformin 1g tds with food |
| <input type="radio"/> | E. Metformin 500mg tds taken at least 1 hour before meals |

Next question

Metformin should be titrated slowly, leave at least 1 week before increasing dose

Gastrointestinal side-effects are more likely to occur if metformin is not slowly titrated up. The BNF advises leaving at least 1 week before increasing the dose.

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome



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Next

A 62-year-old man is reviewed in diabetes clinic. His glycaemic control is poor despite weight loss, adherence to a diabetic diet and his current diabetes medications. He has no other past medical history of note. Which one of the following medications would increase insulin sensitivity?

- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. Repaglinide |
| <input type="radio"/> | B. Tolbutamide |
| <input checked="" type="radio"/> | C. Pioglitazone |
| <input type="radio"/> | D. Acarbose |
| <input type="radio"/> | E. Gliclazide |

Next question

Thiazolidinediones

Thiazolidinediones are a new class of agents used in the treatment of type 2 diabetes mellitus. They are agonists to the PPAR-gamma receptor and reduce peripheral insulin resistance. Rosiglitazone was withdrawn in 2010 following concerns about the cardiovascular side-effect profile.

The PPAR-gamma receptor is an intracellular nuclear receptor. Its natural ligands are free fatty acids and it is thought to control adipocyte differentiation and function.

Adverse effects

- weight gain

- liver impairment: monitor LFTs
- fluid retention - therefore contraindicated in heart failure. The risk of fluid retention is increased if the patient also takes insulin
- recent studies have indicated an increased risk of fractures
- bladder cancer: recent studies have showed an increased risk of bladder cancer in patients taking pioglitazone (hazard ratio 2.64)

NICE guidance on thiazolidinediones

- only continue if there is a reduction of > 0.5 percentage points in HbA1c in 6 months

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[Next](#)

Theme: Thyroid function tests

A.	Secondary hypothyroidism
B.	Subacute (De Quervain's) thyroiditis
C.	Primary atrophic hypothyroidism
D.	Sick euthyroid syndrome
E.	Poor compliance with thyroxine
F.	Graves' disease
G.	Steroid therapy
H.	Pregnancy
I.	Factitious thyroxine-induced hyperthyroidism
J.	Hashimoto's thyroiditis

For each of the following scenarios please select the most likely diagnosis:

28. A 64-year-old man recently discharged from hospital following treatment for a pneumonia:

TSH	0.4 mU/l
Free T4	8.1 pmol/l

 You answered Secondary hypothyroidism

The correct answer is Sick euthyroid syndrome

29. A 43-year-old woman presents with a tender goitre:

TSH	<0.05 mU/l
Free T4	21.7 pmol/l

 You answered Secondary hypothyroidism

The correct answer is Subacute (De Quervain's) thyroiditis

Subacute thyroiditis (also known as De Quervain's thyroiditis) is thought to occur following viral infection and typically presents with hyperthyroidism

Features

- hyperthyroidism
- painful goitre
- raised ESR
- globally reduced uptake on iodine-131 scan

Management

- usually self-limiting - most patients do not require treatment
- thyroid pain may respond to aspirin or other NSAIDs
- in more severe cases steroids are used, particularly if hypothyroidism develops

30. A 34-year-old woman presents with palpitations and feeling hot all the time. On examination she has a non-tender goitre. Bloods show the following:

TSH	<0.05 mU/l
Free T4	22 pmol/l

 You answered Secondary hypothyroidism

The correct answer is Graves' disease

Graves' disease is a much more likely diagnosis than subacute (De Quervain's) thyroiditis which is associated with a tender goitre and raised ESR.

[Next question](#)

Thyroid function tests

The interpretation of thyroid function tests is usually straightforward:

Diagnosis	TSH	Free T4	Notes
Thyrotoxicosis (e.g. Graves' disease)	Low	High	In T3 thyrotoxicosis the free T4 will be normal
Primary hypothyroidism (primary atrophic hypothyroidism)	High	Low	
Secondary hypothyroidism	Low	Low	Replacement steroid therapy is required prior to thyroxine
Sick euthyroid syndrome*	Low**	Low	Common in hospital inpatients T3 is particularly low in these patients
Subclinical hypothyroidism	High	Normal	
Poor compliance with thyroxine	High	Normal	
Steroid therapy	Low	Normal	

*now referred to as non-thyroidal illness

**TSH may be normal in some cases



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Next

A 36-year-old female with a BMI of 34 kg/m² presents to her GP after managing to lose 3 kg in the past month. She asks about the possibility of starting a drug to help her lose weight. What is the primary mode of action of orlistat?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Leptin antagonist |
| <input checked="" type="radio"/> | B. Pancreatic lipase inhibitor |
| <input type="radio"/> | C. Prevents intestinal absorption of low-density lipoproteins |
| <input type="radio"/> | D. HMG-CoA reductase inhibitor |
| <input type="radio"/> | E. Centrally-acting appetite suppressant |

Next question

The primary mode of action of orlistat is to inhibit pancreatic lipases, which in turn will decrease the absorption of lipids from the intestine

Obesity: therapeutic options

The management of obesity consists of a step-wise approach:

- conservative: diet, exercise
- medical
- surgical

Orlistat is a pancreatic lipase inhibitor used in the management of obesity. Adverse effects include faecal urgency/incontinence and flatulence. A lower dose version is now available without prescription ('Alli'). NICE have defined criteria for the use of orlistat. It should only be prescribed as part of an overall plan for managing obesity in adults who have:

- BMI of 28 kg/m² or more with associated risk factors, or
- BMI of 30 kg/m² or more
- continued weight loss e.g. 5% at 3 months
- orlistat is normally used for < 1 year

Sibutramine

- withdrawn January 2010 by the European Medicines Agency due to an increased risk of cardiovascular events
- centrally acting appetite suppressant (inhibits uptake of serotonin and noradrenaline at hypothalamic sites that regulate food intake)
- adverse effects include hypertension (monitor blood pressure and pulse during treatment), constipation, headache, dry mouth, insomnia and anorexia
- contraindicated in psychiatric illness, hypertension, IHD, stroke, arrhythmias

Rimonabant, a specific CB1 cannabinoid receptor antagonist, was withdrawn in October 2008 after the European Medicines Agency warned of serious psychiatric problems including suicide



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Next

A 52-year-old man who has recently been diagnosed with hypertension is reviewed. He describes having some recent polydipsia and polyuria. As part of his initial work-up a HbA1c was requested. What is the lowest IFCC-HbA1c (not DCCT-HbA1c) value that would indicate a diagnosis of diabetes mellitus?

Next question

You answered: **6.5 mmol/mol**

Correct answer: **48 mmol/mol**

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



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Next

You review a 67-year-old man with type 2 diabetes mellitus in the diabetes clinic. His blood pressure is currently 150/86 mmHg. His diabetes is well controlled and there is no evidence of end-organ damage. What should his target blood pressure be?



- | | |
|----------------------------------|------------------|
| <input checked="" type="radio"/> | A. < 140/80 mmHg |
| <input type="radio"/> | B. < 125/75 mmHg |
| <input type="radio"/> | C. < 140/85 mmHg |
| <input type="radio"/> | D. < 130/80 mmHg |
| <input type="radio"/> | E. < 140/90 mmHg |



Next question

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

Diabetes mellitus: hypertension management

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

A 2013 Cochrane review casted doubt on the wisdom of lower blood pressure targets for patients with diabetes. It compared patients who had tight blood pressure control (targets < 130/85 mmHg) with more relaxed control (< 140-160/90-100 mmHg). Patients who were more tightly controlled had a slightly reduced rate of stroke but otherwise outcomes were not significantly different.

Because ACE-inhibitors have a renoprotective effect in diabetes they are the first-line antihypertensives recommended for NICE. Patients of African or Caribbean family origin should be offered an ACE-inhibitor plus either a thiazide diuretic or calcium channel blocker. Further management then reverts to that of non-diabetic patients, as discussed earlier in the module.

Remember that autonomic neuropathy may result in more postural symptoms in patients taking antihypertensive therapy.

The routine use of beta-blockers in uncomplicated hypertension should be avoided, particularly when given in combination with thiazides, as they may cause insulin resistance, impair insulin secretion and alter the autonomic response to hypoglycaemia.



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Next

A 45-year-old man known to have haemochromatosis attends for blood test to assess when he next needs venesection. Of the options given, which one of the following blood tests should be used to assess the adequacy of venesection?



- | | |
|----------------------------------|--------------------------------|
| <input checked="" type="radio"/> | A. Ferritin |
| <input type="radio"/> | B. Serum iron |
| <input type="radio"/> | C. Haemoglobin |
| <input type="radio"/> | D. Total iron binding capacity |
| <input type="radio"/> | E. Haematocrit |

Next question

The British Committee for Standards in Haematology recommend 'transferrin saturation should be kept below 50% and the serum ferritin concentration below 50 ug/l'

Haemochromatosis: investigation

Haemochromatosis is an autosomal recessive disorder of iron absorption and metabolism resulting in iron accumulation. It is caused by inheritance of mutations in the HFE gene on both copies of chromosome 6*. The British Committee for Standards in Haematology (BCSH) published guidelines for the investigation and management of haemochromatosis in 2000

There is continued debate about the best investigation to screen for haemochromatosis. The 2000 BCSH guidelines suggest:

- general population: transferrin saturation is considered the most useful marker. Ferritin should also be measured but is not usually abnormal in the early stages of iron accumulation
- testing family members: genetic testing for HFE mutation

These guidelines may change as HFE gene analysis become less expensive

Diagnostic tests

- molecular genetic testing for the C282Y and H63D mutations
- liver biopsy: Perl's stain

Typical iron study profile in patient with haemochromatosis

- transferrin saturation > 55% in men or > 50% in women
- raised ferritin (e.g. > 500 ug/l) and iron
- low TIBC

Monitoring adequacy of venesection

- BSCH recommend 'transferrin saturation should be kept below 50% and the serum ferritin concentration below 50 ug/l'

Joint x-rays characteristically show chondrocalcinosis

*there are rare cases of families with classic features of genetic haemochromatosis but no mutation in the HFE gene

**Question 35 of 136**

Next

An obese 48-year-old man presents with lethargy and polydipsia. What is the minimum HbA1c that would be diagnostic of type 2 diabetes mellitus?

- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Cannot use HbA1c for diagnosis |
| <input type="radio"/> | B. 6.0% (42 mmol/mol) |
| <input type="radio"/> | C. 6.3% (45 mmol/mol) |
| <input checked="" type="radio"/> | D. 6.5% (48 mmol/mol) |
| <input type="radio"/> | E. 7.0% (53 mmol/mol) |



Next question

Diabetes mellitus - HbA1c of 6.5% or greater is now diagnostic (WHO 2011)

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

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Next

Which one of the following is not part of the diagnostic criteria for the metabolic syndrome?

<input type="radio"/>	A. High triglycerides
<input type="radio"/>	B. Low HDL
<input checked="" type="radio"/>	C. High LDL
<input type="radio"/>	D. Central obesity
<input type="radio"/>	E. Hypertension

Next question

High LDL levels are not part of the World Health Organization or International Diabetes Federation diagnostic criteria

Metabolic syndrome

Unfortunately there are a number of competing definitions of the metabolic syndrome around at the present time. It is thought that the key pathophysiological factor is insulin resistance.

SIGN recommend using criteria similar to those from the American Heart Association. The similarity of the International Diabetes Federation criteria should be noted. For a diagnosis of metabolic syndrome at least 3 of the following should be identified:

- elevated waist circumference: men > 102 cm, women > 88 cm
- elevated triglycerides: > 1.7 mmol/L
- reduced HDL: < 1.03 mmol/L in males and < 1.29 mmol/L in females
- raised blood pressure: > 130/85 mmHg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

The International Diabetes Federation produced a consensus set of diagnostic criteria in 2005, which are now widely in use. These require the presence of central obesity (defined as waist circumference > 94cm for Europid men and > 80cm for Europid women, with ethnicity specific values for other groups) plus any two of the following four factors:

- raised triglycerides level: > 1.7 mmol/L, or specific treatment for this lipid abnormality
- reduced HDL cholesterol: < 1.03 mmol/L in males and < 1.29 mmol/L in females, or specific treatment for this lipid abnormality
- raised blood pressure: > 130/85 mm Hg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

In 1999 the World Health Organization produced diagnostic criteria which required the presence of diabetes mellitus, impaired glucose tolerance, impaired fasting glucose or insulin resistance, AND two of the following:

- blood pressure: > 140/90 mmHg
- dyslipidaemia: triglycerides: > 1.695 mmol/L and/or high-density lipoprotein cholesterol (HDL-C) < 0.9 mmol/L (male), < 1.0 mmol/L (female)
- central obesity: waist:hip ratio > 0.90 (male), > 0.85 (female), and/or body mass index > 30 kg/m²
- microalbuminuria: urinary albumin excretion ratio > 20 mg/min or albumin:creatinine ratio > 30 mg/g

Other associated features include:

- raised uric acid levels
- non-alcoholic fatty liver disease
- polycystic ovarian syndrome



Question 37 of 136

Next

A 45-year woman who you have treated for obesity comes for review. Despite ongoing lifestyle interventions and trials of orlistat and sibutramine she has failed to lose a significant amount of weight. She is currently taking ramipril for hypertension but a recent fasting glucose was normal. For this patient, what is the cut-off body mass index (BMI) that would trigger a referral for consideration of bariatric surgery?



- | | |
|----------------------------------|-------------------------------|
| <input checked="" type="radio"/> | A. BMI > 35 kg/m ² |
| <input type="radio"/> | B. BMI > 40 kg/m ² |
| <input type="radio"/> | C. BMI > 30 kg/m ² |
| <input type="radio"/> | D. BMI > 38 kg/m ² |



E. BMI > 45 kg/m²

[Next question](#)

Obesity - NICE bariatric referral cut-offs

- with risk factors (T2DM, BP etc): > 35 kg/m²
- no risk factors: > 40 kg/m²

Obesity: bariatric surgery

The use of bariatric surgery in the management of obesity has developed significantly over the past decade. It is now recognised that for many obese patients who fail to lose weight with lifestyle and drug interventions the risks and expense of long-term obesity outweigh those of surgery.

NICE guidelines on bariatric surgery for adults

Consider surgery for people with severe obesity if:

- they have a BMI of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² and other significant disease (for example, type 2 diabetes mellitus, hypertension) that could be improved if they lost weight
- all appropriate non-surgical measures have failed to achieve or maintain adequate clinically beneficial weight loss for at least 6 months
- they are receiving or will receive intensive specialist management
- they are generally fit for anaesthesia and surgery
- they commit to the need for long-term follow-up

Consider surgery as a first-line option for adults with a BMI of more than 50 kg/m² in whom surgical intervention is considered appropriate; consider orlistat before surgery if the waiting time is long

Types of bariatric surgery:

- primarily restrictive: laparoscopic-adjustable gastric banding (LAGB) or sleeve gastrectomy
- primarily malabsorptive: classic biliopancreatic diversion (BPD) has now largely been replaced by biliopancreatic diversion with duodenal switch

- mixed: Roux-en-Y gastric bypass surgery

Which operation?

- LAGB produces less weight loss than malabsorptive or mixed procedures but as it has fewer complications it is normally the first-line intervention in patients with a BMI of 30-39kg/m²
- patients with a BMI > 40 kg/m² may be considered for a gastric bypass or sleeve gastrectomy. The latter may be done as a sole procedure or as an initial procedure prior to bypass
- primarily malabsorptive procedures are usually reserved for very obese patients (e.g. BMI > 60 kg/m²)



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Next

A diabetic man is diagnosed as having painful diabetic neuropathy in his feet. He has no other medical history of note. What is the most suitable first-line treatment to relieve his pain?



<input checked="" type="radio"/>	A. Duloxetine
<input type="radio"/>	B. Sodium valproate
<input type="radio"/>	C. Carbamazepine
<input type="radio"/>	D. Referral to pain management clinic
<input type="radio"/>	E. Tramadol



Next question

Diabetic neuropathy

NICE updated its guidance on the management of neuropathic pain in 2013. Diabetic neuropathy is now managed in the same way as other forms of neuropathic pain:

- first-line treatment: amitriptyline, duloxetine, gabapentin or pregabalin

- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

Gastroparesis

- symptoms include erratic blood glucose control, bloating and vomiting
- management options include metoclopramide, domperidone or erythromycin (prokinetic agents)



Question 39 of 136

Next

You review a 47-year-old man one year after he was diagnosed with prediabetes. Last year he had a HbA1c taken after being diagnosed as having hypertension. This was recorded as being 43 mmol/mol (6.1%). His most recent blood test is recorded as being 45 mmol/mol (6.3%) despite the patient reporting that he has changed his diet as instructed and exercising three times a week. His body mass index (BMI) today is 26.5 kg/m². Last year it was 27.5kg/m². What is the most appropriate course of action?



<input checked="" type="radio"/>	A. Start metformin
<input type="radio"/>	B. Start pioglitazone
<input type="radio"/>	C. Start orlistat
<input type="radio"/>	D. Review again in 12 months
<input type="radio"/>	E. Do a oral glucose tolerance test

Next question

NICE recommend metformin for adults at high risk 'whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme'.

Prediabetes and impaired glucose regulation

Prediabetes is a term which is increasingly used where there is impaired glucose levels which are above the normal range but not high enough for a diagnosis of diabetes mellitus. The term includes patients who have been labelled as having either impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Diabetes UK estimate that around 1 in 7 adults in the UK have prediabetes. Many individuals with prediabetes will progress on to developing type 2 diabetes mellitus (T2DM) and they are therefore at greater risk of microvascular and macrovascular complications.

Terminology

- Diabetes UK currently recommend using the term prediabetes when talking to patients and impaired glucose regulation when talking to other healthcare professionals
- research has shown that the term 'prediabetes' has the most impact and is most easily understood

Identification of patients with prediabetes

- NICE recommend using a validated computer based risk assessment tool for all adults aged 40 and over, people of South Asian and Chinese descent aged 25-39, and adults with conditions that increase the risk of type 2 diabetes
- patients identified at high risk should have a blood sample taken
- a fasting plasma glucose of 5.5-6.9 mmol/l or an HbA1c level of 42-47 mmol/mol (6.0-6.4%) indicates high risk

Management

- lifestyle modification: weight loss, increased exercise, change in diet
- at least yearly follow-up with blood tests is recommended
- NICE recommend metformin for adults at high risk *'whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme'*

Impaired fasting glucose and impaired glucose tolerance

There are two main types of IGR:

- impaired fasting glucose (IFG) - due to hepatic insulin resistance

- impaired glucose tolerance (IGT) - due to muscle insulin resistance
- patients with IGT are more likely to develop T2DM and cardiovascular disease than patients with IFG

Definitions

- a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)
- impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l
- people with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT



Question 40 of 136

Next

A 34-year-old woman who takes hydrocortisone and fludrocortisone replacement therapy for Addison's disease presents for review. She has a three-day history of a productive cough associated with feeling hot. On examination the chest is clear, her pulse is 84 / min and temperature is 37.7°C. You elect to prescribe an antibiotic given her medical history. What is the most appropriate advice with regard to her adrenal replacement therapy?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Keep the same hydrocortisone and fludrocortisone dose |
| <input checked="" type="radio"/> | B. Double both the hydrocortisone and fludrocortisone dose |
| <input checked="" type="radio"/> | C. Double the hydrocortisone dose, keep the same fludrocortisone dose |
| <input type="radio"/> | D. Convert her to prednisolone for the duration of the illness |
| <input type="radio"/> | E. Stop the hydrocortisone and fludrocortisone until the patient recovers |

Next question

Addison's patient unwell? Double the glucocorticoids

Addison's disease: management

Patients who have Addison's disease are usually given both glucocorticoid and mineralocorticoid replacement therapy.

This usually means that patients take a combination of:

- hydrocortisone: usually given in 2 or 3 divided doses. Patients typically require 20-30 mg per day, with the majority given in the morning dose
- fludrocortisone

Patient education is important:

- emphasise the importance of not missing glucocorticoid doses
- consider MedicAlert bracelets and steroid cards
- discuss how to adjust the glucocorticoid dose during an intercurrent illness (see below)

Management of intercurrent illness

- in simple terms the glucocorticoid dose should be doubled
- the Addison's Clinical Advisory Panel have produced guidelines detailing particular scenarios - please see the CKS link for more details



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Next

Which of the following drugs is most likely to cause impaired glucose tolerance?

- ✓ ☒ A. Bendroflumethiazide
- ☐ B. Perindopril
- ☐ C. Salicylates
- ☐ D. Co-amoxiclav
- ✗ ☐ E. Beta-blockers

Next question

Bendroflumethiazide is more likely than beta-blockers to cause impaired glucose tolerance.

Drug-induced impaired glucose tolerance

Drugs which are known to cause impaired glucose tolerance include:

- thiazides, furosemide (less common)
- steroids
- tacrolimus, ciclosporin
- interferon-alpha
- nicotinic acid
- atypical antipsychotics e.g. olanzapine

Beta-blockers cause a slight impairment of glucose tolerance. They should also be used with caution in diabetics as they can interfere with the metabolic and autonomic responses to hypoglycaemia

✓ Question 42 of 136

Next

A 43-year-old woman presents for follow-up in clinic. She was diagnosed with Hashimoto's thyroiditis four months ago and is currently being treated with levothyroxine 75 mcg od. What is the single most important blood test to assess her response to treatment?

- ☐ A. ESR
- ✓ ☒ B. TSH

<input type="radio"/>	C. Free T4
<input type="radio"/>	D. Total T4
<input type="radio"/>	E. Free T3

[Next question](#)

Hypothyroidism: management

Key points

- initial starting dose of levothyroxine should be lower in elderly patients and those with ischaemic heart disease. The BNF recommends that for patients with cardiac disease, severe hypothyroidism or patients over 50 years the initial starting dose should be 25mcg od with dose slowly titrated. Other patients should be started on a dose of 50-100mcg od
- following a change in thyroxine dose thyroid function tests should be checked after 8-12 weeks
- the therapeutic goal is 'normalisation' of the thyroid stimulating hormone (TSH) level. As the majority of unaffected people have a TSH value 0.5-2.5 mU/l it is now thought preferable to aim for a TSH in this range
- there is no evidence to support combination therapy with levothyroxine and liothyronine

Side-effects of thyroxine therapy

- hyperthyroidism: due to over treatment
- reduced bone mineral density
- worsening of angina
- atrial fibrillation

Interactions

- iron: absorption of levothyroxine reduced, give at least 2 hours apart



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Next

Which of the following results establishes a diagnosis of diabetes mellitus?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Asymptomatic patient with fasting glucose 7.9 mmol/L on one occasion |
| <input type="radio"/> | B. Symptomatic patient with fasting glucose 6.8 mmol/L on two occasions |
| <input type="radio"/> | C. Glycosuria +++ |
| <input type="radio"/> | D. Asymptomatic patient with random glucose 22.0 mmol/L on one occasion |
| <input checked="" type="radio"/> | E. Symptomatic patient with random glucose 12.0 mmol/L on one occasion |

Next question

Diabetes diagnosis: fasting > 7.0, random > 11.1 - if asymptomatic need two readings

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus

- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



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Next

A 59-year-old man with a history of type 2 diabetes mellitus and benign prostatic hypertrophy develops urinary retention associated with acute renal failure. Which one of the following drugs should be discontinued?

<input type="radio"/>	A. Gliclazide
<input type="radio"/>	B. Paroxetine
<input checked="" type="radio"/>	C. Atenolol
<input checked="" type="radio"/>	D. Metformin
<input type="radio"/>	E. Finasteride

Next question

As the patient has developed acute renal failure metformin should be stopped due to the risk of lactic acidosis. In the long term paroxetine may also need to be stopped as SSRIs can contribute to urinary retention.

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome



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Next

A 33-year-old female is referred by her GP with thyrotoxicosis. Following a discussion of management options she elects to have radioiodine therapy. Which one of the following is the most likely adverse effect?



A. Hypothyroidism



B. Thyroid malignancy



C. Agranulocytosis



D. Oesophagitis



E. Precipitation of thyroid eye disease

Next question

It is well documented that radioiodine therapy can precipitate thyroid eye disease but a majority of patients eventually require thyroxine replacement

Graves' disease: management

Despite many trials there is no clear guidance on the optimal management of Graves' disease. Treatment options include titration of anti-thyroid drugs (ATDs, for example carbimazole), block-and-replace regimes, radioiodine treatment and surgery. Propranolol is often given initially to block adrenergic effects

ATD titration

- carbimazole is started at 40mg and reduced gradually to maintain euthyroidism
- typically continued for 12-18 months
- patients following an ATD titration regime have been shown to suffer fewer side-effects than those on a block-and-replace regime

Block-and-replace

- carbimazole is started at 40mg
- thyroxine is added when the patient is euthyroid
- treatment typically lasts for 6-9 months

The major complication of carbimazole therapy is agranulocytosis

Radioiodine treatment

- contraindications include pregnancy (should be avoided for 4-6 months following treatment) and age < 16 years. Thyroid eye disease is a relative contraindication, as it may worsen the condition
- the proportion of patients who become hypothyroid depends on the dose given, but as a rule the majority of patient will require thyroxine supplementation after 5 years



A 44-year-old woman presents to her GP as she is feeling 'hot all the time' and is consequently worried she is going through an early menopause. Her husband has also noticed a 'fullness' of her neck which has become apparent over the past few weeks. On examination her pulse is 90/minute and she has a small, non-tender goitre. Blood tests are arranged:

TSH	< 0.05 mu/l
Free T4	24 pmol/l
Anti-thyroid peroxidase antibodies	102 IU/mL (< 35 IU/mL)
ESR	23 mm/hr

What is the most likely diagnosis?



- ☐ A. Hashimoto's thyroiditis
- ☐ B. Toxic multinodular goitre
- ☐ C. Thyroid cancer
- ☐ D. De Quervain's thyroiditis
- ☒ E. Graves' disease

[Next question](#)

The thyrotoxic symptoms and blood tests, goitre and anti-thyroid peroxidase antibodies suggest a diagnosis of Graves' disease.

The ESR result is within normal range.

Hashimoto's thyroiditis is associated with hypothyroidism.

Graves' disease: features

Graves' disease is the most common cause of thyrotoxicosis. It is typically seen in women aged 30-50 years.

Features

- typical features of thyrotoxicosis
- specific signs limited to Grave's (see below)

Features seen in Graves' but not in other causes of thyrotoxicosis

- eye signs (30% of patients): exophthalmos, ophthalmoplegia
- pretibial myxoedema
- thyroid acropachy

Autoantibodies

- anti-TSH receptor stimulating antibodies (90%)
- anti-thyroid peroxidase antibodies (50%)



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Next

You are reviewing a 57-year-old man who was diagnosed with type 2 diabetes mellitus around four months ago. At the time of diagnosis his HbA1c was 54 mmol/mol (7.1%). He was started on metformin and the dose was titrated up. At what threshold should you consider adding a second agent?



<input type="radio"/>	A. 42 mmol/mol (6.0%)
<input type="radio"/>	B. 45 mmol/mol (6.3%)
<input checked="" type="radio"/>	C. 48 mmol/mol (6.5%)
<input type="radio"/>	D. 53 mmol/mol (7.0%)
<input type="radio"/>	E. 58 mmol/mol (7.5%)

Next question

After starting metformin, step-up treatment if HbA1c remains > 48 mmol/mol (6.5%)

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*

- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 65-year-old man who is known to have type 2 diabetes mellitus presents for advice. He is a Muslim and is considering fasting for Ramadan. His diabetes is currently controlled with a

combination of diet and metformin 500mg tds. Looking at his records the last HbA1c was 6.4% (46 mmol/mol). If he decides to fast during Ramadan, what is the most appropriate advice to give regarding his metformin?

- ☐ A. Metformin should be stopped
- ☐ B. Metformin 1.5g after sunset
- ☒ C. Metformin 500mg before sunrise, 1g after sunset
- ☐ D. Metformin 500mg after sunset
- ☐ E. Metformin 1g before sunrise, 500mg after sunset

Next question

During Ramadan, one-third of the normal metformin dose should be taken before sunrise and two-thirds should be taken after sunset

Diabetes mellitus: Ramadan

We know that type 2 diabetes mellitus is more common in people of Asian ethnicity and a significant proportion of those patients in the UK will be Muslim. The BMJ published an excellent and comprehensive review of this issue in 2010¹.

It is important that we can give appropriate advice to Muslim patients to allow them safely observe their fast. This is particularly important from 2014 as Ramadan is due to fall in the long days of the summer months for several years henceforth.

Clearly it is a personal decision whether a patient decides to fast. It may however be worthwhile exploring the fact that people with chronic conditions are exempt from fasting or may be able to delay fasting to the shorter days of the winter months. It is however known that many Muslim patients with diabetes do not class themselves as having a chronic/serious condition which should exempt them from fasting. Around 79% of Muslim patients with type 2 diabetes mellitus fast Ramadan². There is an excellent patient information leaflet from Diabetes UK and the Muslim Council of Britain which explores these options in more detail.

If a patient with type 2 diabetes mellitus does decide to fast:

- they should try and eat a meal containing long-acting carbohydrates prior to sunrise (Suhoor)
- patients should be given a blood glucose monitor to allow them to check their glucose levels, particularly if they feel unwell
- for patients taking metformin the expert consensus is that the dose should be split one-third before sunrise (Suhoor) and two-thirds after sunset (Iftar)
- expert consensus also recommends switching once-daily sulfonylureas to after sunset. For patients taking twice-daily preparations such as gliclazide it is recommended that a larger proportion of the dose is taken after sunset
- no adjustment is needed for patients taking pioglitazone

1. Management of people with diabetes wanting to fast during Ramadan BMJ 2010;340:c3053

2. Salti I et al. Results of the Epidemiology of Diabetes and Ramadan (EPIDIAR) study. Diabetes Care 2004;27:2306-11.



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Next

Which one of the following statements regarding the metabolic syndrome is correct?

- | | | |
|----------------------------------|----|---|
| <input type="radio"/> | A. | The WHO criteria are used to define impaired glucose tolerance |
| <input type="radio"/> | B. | The central pathophysiological change is thought to be reduced insulin production |
| <input checked="" type="radio"/> | C. | A diagnosis cannot be made without weighing the patient |
| <input type="radio"/> | D. | A raised LDL concentration is one of the key criteria in most definitions |
| <input checked="" type="radio"/> | E. | Decisions on cardiovascular risk factor modification should be made regardless of whether patients meet the criteria for metabolic syndrome |

Next question

Decisions on primary prevention of cardiovascular disease should be made using standard tools and are not dependant on whether a diagnosis of metabolic syndrome is made.

Metabolic syndrome

Unfortunately there are a number of competing definitions of the metabolic syndrome around at the present time. It is thought that the key pathophysiological factor is insulin resistance.

SIGN recommend using criteria similar to those from the American Heart Association. The similarity of the International Diabetes Federation criteria should be noted. For a diagnosis of metabolic syndrome at least 3 of the following should be identified:

- elevated waist circumference: men > 102 cm, women > 88 cm
- elevated triglycerides: > 1.7 mmol/L
- reduced HDL: < 1.03 mmol/L in males and < 1.29 mmol/L in females
- raised blood pressure: > 130/85 mmHg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

The International Diabetes Federation produced a consensus set of diagnostic criteria in 2005, which are now widely in use. These require the presence of central obesity (defined as waist circumference > 94cm for European men and > 80cm for European women, with ethnicity specific values for other groups) plus any two of the following four factors:

- raised triglycerides level: > 1.7 mmol/L, or specific treatment for this lipid abnormality
- reduced HDL cholesterol: < 1.03 mmol/L in males and < 1.29 mmol/L in females, or specific treatment for this lipid abnormality
- raised blood pressure: > 130/85 mm Hg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

In 1999 the World Health Organization produced diagnostic criteria which required the presence of diabetes mellitus, impaired glucose tolerance, impaired fasting glucose or insulin resistance, AND two of the following:

- blood pressure: > 140/90 mmHg
- dyslipidaemia: triglycerides: > 1.695 mmol/L and/or high-density lipoprotein cholesterol (HDL-C) < 0.9 mmol/L (male), < 1.0 mmol/L (female)
- central obesity: waist:hip ratio > 0.90 (male), > 0.85 (female), and/or body mass index > 30 kg/m²
- microalbuminuria: urinary albumin excretion ratio > 20 mg/min or albumin:creatinine ratio > 30 mg/g

Other associated features include:

- raised uric acid levels
- non-alcoholic fatty liver disease
- polycystic ovarian syndrome



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Next

You review a 49-year-old woman who has recently been diagnosed with rheumatoid arthritis. Around three months ago she was started on methotrexate with the addition of prednisolone to gain rapid control of her symptoms. She is now taking methotrexate 15mg once weekly and is still taking prednisolone 10mg od. Unfortunately she is experiencing a number of side-effects. Which one of the following is most likely to be secondary to the prednisolone?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. 'Loss of appetite' |
| <input type="radio"/> | B. 'Tired all the time' |
| <input checked="" type="radio"/> | C. 'My shoulder and leg muscles feel weak' |
| <input type="radio"/> | D. 'Diarrhoea' |
| <input type="radio"/> | E. 'Blue tinge to my vision' |

Next question

Proximal myopathy is common with longer term steroid use. Some of the other side-effects may of course be secondary to either the methotrexate or ongoing rheumatoid disease.

Corticosteroids

Corticosteroids are amongst the most commonly prescribed therapies in clinical practice. They are used both systemically (oral or intravenous) or locally (skin creams, inhalers, eye drops, intra-articular). They augment and in some cases replace the natural glucocorticoid and mineralocorticoid activity of endogenous steroids.

The relative glucocorticoid and mineralocorticoid activity of commonly used steroids is shown below:

Minimal glucocorticoid activity, very high mineralocorticoid activity,	Glucocorticoid activity, high mineralocorticoid activity,	Predominant glucocorticoid activity, low mineralocorticoid activity	Very high glucocorticoid activity, minimal mineralocorticoid activity
Fludrocortisone	Hydrocortisone	Prednisolone	Dexamethasone Betmethasone

Side-effects

The side-effects of corticosteroids are numerous and represent the single greatest limitation on their usage. Side-effects are more common with systemic and prolonged therapy.

Glucocorticoid side-effects

- endocrine: impaired glucose regulation, increased appetite/weight gain, hirsutism, hyperlipidaemia
- Cushing's syndrome: moon face, buffalo hump, striae
- musculoskeletal: osteoporosis, proximal myopathy, avascular necrosis of the femoral head
- immunosuppression: increased susceptibility to severe infection, reactivation of tuberculosis
- psychiatric: insomnia, mania, depression, psychosis
- gastrointestinal: peptic ulceration, acute pancreatitis
- ophthalmic: glaucoma, cataracts
- suppression of growth in children
- intracranial hypertension

Mineralocorticoid side-effects

- fluid retention
- hypertension

Selected points on the use of corticosteroids:

- patients on long-term steroids should have their doses doubled during intercurrent illness
- the BNF suggests gradual withdrawal of systemic corticosteroids if patients have: received more than 40mg prednisolone daily for more than one week, received more than 3 weeks treatment or recently received repeated courses



Question 51 of 136

Next

When treating a diabetic patient with hypertension, which one of the following combinations of anti-hypertensives should be avoided if possible?

- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Thiazide + calcium channel blocker |
| <input type="radio"/> | B. Thiazide + ACE-inhibitor |
| <input checked="" type="radio"/> | C. Beta-blocker + thiazide |
| <input type="radio"/> | D. Beta-blocker + ACE-inhibitor |
| <input type="radio"/> | E. Doxazosin + beta-blocker |

Next question

Diabetes mellitus: hypertension management

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

A 2013 Cochrane review casted doubt on the wisdom of lower blood pressure targets for patients with diabetes. It compared patients who had tight blood pressure control (targets < 130/85 mmHg) with more relaxed control (< 140-160/90-100 mmHg). Patients who were more tightly controlled had a slightly reduced rate of stroke but otherwise outcomes were not significantly different.

Because ACE-inhibitors have a renoprotective effect in diabetes they are the first-line antihypertensives recommended for NICE. Patients of African or Caribbean family origin should be offered an ACE-inhibitor plus either a thiazide diuretic or calcium channel blocker. Further management then reverts to that of non-diabetic patients, as discussed earlier in the module.

Remember that autonomic neuropathy may result in more postural symptoms in patients taking antihypertensive therapy.

The routine use of beta-blockers in uncomplicated hypertension should be avoided, particularly when given in combination with thiazides, as they may cause insulin resistance, impair insulin secretion and alter the autonomic response to hypoglycaemia.



Question 52 of 136

Next

A 36-year-old woman is reviewed 3 months post-partum. During the pregnancy she was diagnosed with gestational diabetes. Following the delivery her glycaemic control has failed to improve and she has been diagnosed as having type 2 diabetes mellitus. She is only slightly overweight (body mass index 27.1 kg/m²) and you are worried about missing maturity onset diabetes of the young (MODY) or type 1 diabetes. Which one of the following is most suggestive of MODY?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Ketosis during periods of hyperglycaemia |
| <input checked="" type="radio"/> | B. Family history of early onset diabetes mellitus |
| <input type="radio"/> | C. A history of polycystic ovarian syndrome |
| <input type="radio"/> | D. Lack of response to sulphonylureas |
| <input type="radio"/> | E. A history of autoimmune disease |

Next question

MODY is inherited in an autosomal dominant fashion so a family history is often present

MODY

Maturity-onset diabetes of the young (MODY) is characterised by the development of type 2 diabetes mellitus in patients < 25 years old. It is typically inherited as an autosomal dominant condition. Over six different genetic mutations have so far been identified as leading to MODY.

It is thought that around 1-2% of patients with diabetes mellitus have MODY, and around 90% are misclassified as having either type 1 or type 2 diabetes mellitus.

MODY 3

- 60% of cases
- due to a defect in the HNF-1 alpha gene

MODY 2

- 20% of cases
- due to a defect in the glucokinase gene

Features of MODY

- typically develops in patients < 25 years
- a family history of early onset diabetes is often present
- ketosis is not a feature at presentation
- patients with the most common form are very sensitive to sulfonylureas, insulin is not usually necessary



Question 53 of 136

Next

A 72-year-old man is reviewed in the diabetes clinic. He has a history of heart failure and type 2 diabetes mellitus. His current medications include furosemide 40mg od, ramipril 10mg od and bisoprolol 5mg od. Clinical examination is unremarkable with no evidence of peripheral oedema, a clear chest and blood pressure of 130/76 mmHg. Recent renal and liver function tests are normal. Which one of the following medications is contraindicated?



- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. Sitagliptin |
| <input checked="" type="radio"/> | B. Pioglitazone |
| <input type="radio"/> | C. Gliclazide |
| <input type="radio"/> | D. Exenatide |



E. Metformin

[Next question](#)

Thiazolidinediones are absolutely contraindicated in heart failure

Thiazolidinediones

Thiazolidinediones are a new class of agents used in the treatment of type 2 diabetes mellitus. They are agonists to the PPAR-gamma receptor and reduce peripheral insulin resistance. Rosiglitazone was withdrawn in 2010 following concerns about the cardiovascular side-effect profile.

The PPAR-gamma receptor is an intracellular nuclear receptor. Its natural ligands are free fatty acids and it is thought to control adipocyte differentiation and function.

Adverse effects

- weight gain
- liver impairment: monitor LFTs
- fluid retention - therefore contraindicated in heart failure. The risk of fluid retention is increased if the patient also takes insulin
- recent studies have indicated an increased risk of fractures
- bladder cancer: recent studies have showed an increased risk of bladder cancer in patients taking pioglitazone (hazard ratio 2.64)

NICE guidance on thiazolidinediones

- only continue if there is a reduction of > 0.5 percentage points in HbA1c in 6 months



Question 54 of 136

[Next](#)

A 51-year-old woman who is known to have poorly controlled type 1 diabetes mellitus is reviewed. Her main presenting complaint is bloating and vomiting after eating. She also notes that her blood glucose readings have become more erratic recently. Which one of the following medications is most likely to be beneficial?

- | | |
|---|---|
| <input type="radio"/> | A. <i>Helicobacter pylori</i> eradication therapy |
|  <input type="radio"/> | B. Lansoprazole |
| <input type="radio"/> | C. Amitriptyline |
|  <input type="radio"/> | D. Metoclopramide |
| <input type="radio"/> | E. Cyclizine |

Next question

Diabetic neuropathy

NICE updated its guidance on the management of neuropathic pain in 2013. Diabetic neuropathy is now managed in the same way as other forms of neuropathic pain:

- first-line treatment: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

Gastroparesis



- symptoms include erratic blood glucose control, bloating and vomiting
- management options include metoclopramide, domperidone or erythromycin (prokinetic agents)



Question 55 of 136

Next

A 20-year-old woman who has type 1 diabetes mellitus is found collapsed in the corridor. A nurse is already with her and has done a finger-prick glucose which is 1.8 mmol/l. On assessment you find that she is not responsive to voice, pulse 84/min. The nurse has already placed the patient in the recovery position. What is the most appropriate next step in management?

<input type="radio"/>	A.	Smear quick-acting carbohydrate gel on the gums
<input type="radio"/>	B.	Give rectal dextrose
 <input type="radio"/>	C.	Give intramuscular protamine sulphate
 <input type="radio"/>	D.	Give intramuscular glucagon
<input type="radio"/>	E.	Give intramuscular dextrose

Next question

It is potentially dangerous to place anything inside the mouth of an unconscious patient as they may not be protecting their airway properly.

Protamine sulphate is used in heparin overdose.

Insulin therapy: side-effects

Hypoglycaemia

- patients should be taught the signs of hypoglycaemia: sweating, anxiety, blurred vision, confusion, aggression
- conscious patients should take 10-20g of a short-acting carbohydrate (e.g. a glass of Lucozade or non-diet drink, three or more glucose tablets, glucose gel)
- every person treated with insulin should have a glucagon kit for emergencies where the patient is not able to orally ingest a short-acting carbohydrate
- patients who have frequent hypoglycaemic episodes may develop reduced awareness. If this develops then allowing glycaemic control to slip for a period of time may restore their awareness
- beta-blockers reduce hypoglycaemic awareness

Lipodystrophy

- typically presents as atrophy of the subcutaneous fat
- can be prevented by rotating the injection site



Question 56 of 136

Next

A 25-year-old man presents with lethargy and increased skin pigmentation. Blood test reveal deranged liver function tests and impaired glucose tolerance. Given the likely diagnosis of haemochromatosis, what is the most appropriate initial investigation strategy?



- | | |
|----------------------------------|--------------------------------------|
| <input checked="" type="radio"/> | A. Transferrin saturation + ferritin |
| <input type="radio"/> | B. Haematocrit + ferritin |
| <input type="radio"/> | C. Liver biopsy with Perl's stain |
| <input type="radio"/> | D. Serum iron + ferritin |
| <input type="radio"/> | E. Serum iron + haematocrit |

Next question

Screening for haemochromatosis

- general population: transferrin saturation > ferritin
- family members: HFE genetic testing

The British Committee for Standards in Haematology (BCSH) guidelines recommend measuring the transferrin saturation first as this is the most specific and sensitive test for iron accumulation. They also recommend that serum ferritin is measured but this marker is not usually abnormal in the early stages of iron accumulation

Haemochromatosis: investigation

Haemochromatosis is an autosomal recessive disorder of iron absorption and metabolism resulting in iron accumulation. It is caused by inheritance of mutations in the HFE gene on both copies of chromosome 6*. The British Committee for Standards in Haematology (BCSH) published guidelines for the investigation and management of haemochromatosis in 2000

There is continued debate about the best investigation to screen for haemochromatosis. The 2000 BCSH guidelines suggest:

- general population: transferrin saturation is considered the most useful marker. Ferritin should also be measured but is not usually abnormal in the early stages of iron accumulation
- testing family members: genetic testing for HFE mutation

These guidelines may change as HFE gene analysis become less expensive

Diagnostic tests

- molecular genetic testing for the C282Y and H63D mutations
- liver biopsy: Perl's stain

Typical iron study profile in patient with haemochromatosis

- transferrin saturation > 55% in men or > 50% in women
- raised ferritin (e.g. > 500 ug/l) and iron
- low TIBC

Monitoring adequacy of venesection

- BSCH recommend 'transferrin saturation should be kept below 50% and the serum ferritin concentration below 50 ug/l'

Joint x-rays characteristically show chondrocalcinosis

*there are rare cases of families with classic features of genetic haemochromatosis but no mutation in the HFE gene



Question 57 of 136

Next

Which one of the following is not an indication for treating a patient with subclinical hypothyroidism?

- | | |
|-----------------------|--|
| <input type="radio"/> | A. Previous treatment of Graves' disease |
| <input type="radio"/> | B. TSH > 10 |



C. Raised ESR



D. Positive thyroid autoantibodies



E. Other autoimmune disorder

[Next question](#)

Subclinical hypothyroidism

Basics

- TSH raised but T3, T4 normal
- no obvious symptoms

Significance

- risk of progressing to overt hypothyroidism is 2-5% per year (higher in men)
- risk increased by presence of thyroid autoantibodies

Treat if

- TSH > 10
- thyroid autoantibodies positive
- other autoimmune disorder
- previous treatment of Graves' disease



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[Next](#)

A 45-year-old man with a history of depression and gastro-oesophageal reflux disease presents to his GP due to a milky discharge from his nipples. The following blood results are obtained:

Prolactin 700 mu/l

Which one of his medications is most likely to be responsible?

- | | |
|----------------------------------|-------------------|
| <input type="radio"/> | A. Omeprazole |
| <input checked="" type="radio"/> | B. Fluoxetine |
| <input checked="" type="radio"/> | C. Metoclopramide |
| <input type="radio"/> | D. Cimetidine |
| <input type="radio"/> | E. Amitriptyline |

Next question

Causes of raised prolactin - the p's

- pregnancy
- prolactinoma
- physiological
- polycystic ovarian syndrome
- primary hypothyroidism
- phenothiazines, metoclopramide, domperidone

Selective serotonin reuptake inhibitors such as fluoxetine have rarely been associated with hyperprolactinaemia but the most likely cause in this patient is metoclopramide. Cimetidine is generally associated with gynaecomastia, rather than galactorrhoea ('very rare', according to the BNF).

Prolactin and galactorrhoea

Prolactin is secreted by the anterior pituitary gland with release being controlled by a wide variety of physiological factors. Dopamine acts as the primary prolactin releasing inhibitory factor and hence dopamine agonists such as bromocriptine may be used to control galactorrhoea. It is important to differentiate the causes of galactorrhoea (due to the actions of prolactin on breast tissue) from those of gynaecomastia

Features of excess prolactin

- men: impotence, loss of libido, galactorrhoea
- women: amenorrhoea, galactorrhoea

Causes of raised prolactin

- prolactinoma
- pregnancy
- oestrogens
- physiological: stress, exercise, sleep
- acromegaly: 1/3 of patients
- polycystic ovarian syndrome
- primary hypothyroidism (due to thyrotrophin releasing hormone (TRH) stimulating prolactin release)

Drug causes of raised prolactin

- metoclopramide, domperidone
- phenothiazines
- haloperidol
- very rare: SSRIs, opioids



Question 59 of 136

Next

A 51-year-old woman is reviewed in the diabetes clinic. She was diagnosed with type 2 diabetes mellitus 12 months ago and still has poor glycaemic control. She has recently had to stop taking gliclazide due to repeated episodes of hypoglycaemia and is only taking maximum dose metformin. Her BMI is 26 kg/m². What is the most appropriate next step in management?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Add either a thiazolidinedione or a DPP-4 inhibitor |
| <input type="radio"/> | B. Refer her for a laparoscopic gastric band |
| <input type="radio"/> | C. Refer her for insulin therapy |
| <input type="radio"/> | D. Add either a thiazolidinedione or exenatide |



E. Add either a DPP-4 inhibitor or exenatide

Next question

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*

- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



You review a 61-year-old woman who has type 2 diabetes mellitus. She is currently taking metformin therapy but her HbA1c is 54 mmol/mol (7.1%). You are considering prescribing a DPP-4 inhibitor. Which one of the following best describes the side-effect profile?

- ☐ A. Weight gain + hypoglycaemia
- ☐ B. Weight gain + no hypoglycaemia
- ☒ C. Weight neutral + no hypoglycaemia
- ☐ D. Weight neutral + hypoglycaemia
- ☐ E. Weight neutral + hypoglycaemia + fluid retention

[Next question](#)

Diabetes mellitus: GLP-1 and the new drugs

A number of new drugs to treat diabetes mellitus have become available in recent years. Much research has focused around the role of glucagon-like peptide-1 (GLP-1), a hormone released by the small intestine in response to an oral glucose load

Whilst it is well known that insulin resistance and insufficient B-cell compensation occur other effects are also seen in type 2 diabetes mellitus (T2DM). In normal physiology an oral glucose load results in a greater release of insulin than if the same load is given intravenously - this known as the incretin effect. This effect is largely mediated by GLP-1 and is known to be decreased in T2DM.

Increasing GLP-1 levels, either by the administration of an analogue (glucagon-like peptide-1, GLP-1 mimetics, e.g. exenatide) or inhibiting its breakdown (dipeptidyl peptidase-4, DPP-4 inhibitors - the gliptins), is therefore the target of two recent classes of drug.

Glucagon-like peptide-1 (GLP-1) mimetics (e.g. exenatide)

Exenatide is an example of a glucagon-like peptide-1 (GLP-1) mimetic. These drugs increase insulin secretion and inhibit glucagon secretion. One of the major advances of GLP-1 mimetics is that they typically result in weight loss, in contrast to many medications such as insulin, sulfonylureas and thiazolidinediones.

Exenatide must be given by subcutaneous injection within 60 minutes before the morning and evening meals. It should not be given after a meal.

Liraglutide is the other GLP-1 mimetic currently available. One of the main advantages of liraglutide over exenatide is that it only needs to be given once a day.

Both exenatide and liraglutide may be combined with metformin and a sulfonylurea. Standard release exenatide is also licensed to be used with basal insulin alone or with metformin. Please see the BNF for a more complete list of licensed indications.

NICE state the following:

Consider adding exenatide to metformin and a sulfonylurea if:

- *BMI \geq 35 kg/m² in people of European descent and there are problems associated with high weight, or*
- *BMI $<$ 35 kg/m² and insulin is unacceptable because of occupational implications or weight loss would benefit other comorbidities.*

NICE like patients to have achieved a 1% reduction in HbA1c and 3% weight loss after 6 months to justify the ongoing prescription of GLP-1 mimetics.

The major adverse effect of GLP-1 mimetics is nausea and vomiting. The Medicines and Healthcare products Regulatory Agency has issued specific warnings on the use of exenatide, reporting that it has been linked to severe pancreatitis in some patients.

Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. Vildagliptin, sitagliptin)

Key points

- oral preparation
- trials to date show that the drugs are relatively well tolerated with no increased incidence of hypoglycaemia
- do not cause weight gain

NICE guidelines on DPP-4 inhibitors

- continue DPP-4 inhibitor only if there is a reduction of > 0.5 percentage points in HBA1c in 6 months
- NICE suggest that a DPP-4 inhibitor might be preferable to a thiazolidinedione if further weight gain would cause significant problems, a thiazolidinedione is contraindicated or the person has had a poor response to a thiazolidinedione



Question 61 of 136

Next

A 31-year-old woman is diagnosed with familial hypercholesterolaemia. Genetic testing shows that she is heterozygous for the condition. You discuss the possibility of screening her relatives. The patient reports that her father has a normal cholesterol level. What is the chance her brother will also be affected?

- ☒ A. 50%
- ☐ B. 66%
- ☐ C. 25%
- ☐ D. 100%
- ☐ E. 0%

Next question

As familial hypercholesterolaemia is an autosomal dominant condition 50% of the first-degree relatives of heterozygotes will be affected. Please see the PLoS link for more details.

Familial hypercholesterolaemia

Familial hypercholesterolaemia (FH) is an autosomal dominant condition that is thought to affect around 1 in 500 people. It results in high levels of LDL-cholesterol which, if untreated, may cause early cardiovascular disease (CVD). FH is caused by mutations in the gene which encodes the LDL-receptor protein.

Clinical diagnosis is now based on the **Simon Broome criteria**:

- in adults total cholesterol (TC) > 7.5 mmol/l and LDL-C > 4.9 mmol/l or children TC > 6.7 mmol/l and LDL-C > 4.0 mmol/l, plus:
- for definite FH: tendon xanthoma in patients or 1st or 2nd degree relatives or DNA-based evidence of FH
- for possible FH: family history of myocardial infarction below age 50 years in 2nd degree relative, below age 60 in 1st degree relative, or a family history of raised cholesterol levels

Management

- the use of CVD risk estimation using standard tables is not appropriate in FH as they do not accurately reflect the risk of CVD
- referral to a specialist lipid clinic is usually required
- the maximum dose of potent statins are usually required
- first-degree relatives have a 50% chance of having the disorder and should therefore be offered screening. This includes children who should be screened by the age of 10 years if there is one affected parent
- statins should be discontinued in women 3 months before conception due to the risk of congenital defects



Question 62 of 136

Next

A 43-year-old man presents to surgery with lethargy. Examination is unremarkable apart from a blood pressure of 192/112 mmHg. Routine blood tests reveal:

Na ⁺	146 mmol/l
K ⁺	2.4 mmol/l
Bicarbonate	34 mmol/l
Urea	5.3 mmol/l
Creatinine	75 µmol/l

What is the most likely diagnosis?



A. Pheochromocytoma

- | | |
|----------------------------------|-------------------------------|
| <input type="radio"/> | B. Renal artery stenosis |
| <input type="radio"/> | C. Diabetes mellitus |
| <input type="radio"/> | D. Bartter's syndrome |
| <input checked="" type="radio"/> | E. Primary hyperaldosteronism |

Next question

Hypokalaemia associated with hypertension points towards a diagnosis of primary hyperaldosteronism. Bartter's syndrome is associated with normotension

Primary hyperaldosteronism

Primary hyperaldosteronism was previously thought to be most commonly caused by an adrenal adenoma, termed Conn's syndrome. However, recent studies have shown that bilateral idiopathic adrenal hyperplasia is the cause in up to 70% of cases. Differentiating between the two is important as this determines treatment. Adrenal carcinoma is an extremely rare cause of primary hyperaldosteronism

Features

- hypertension
- hypokalaemia (e.g. muscle weakness)
- alkalosis

Investigations

- high serum aldosterone
- low serum renin
- high-resolution CT abdomen
- adrenal vein sampling

Management

- adrenal adenoma: surgery
- bilateral adrenocortical hyperplasia: aldosterone antagonist e.g. spironolactone

*please note that some of these notes have been copied to Wikipedia, and not vice-versa

Next

A 56-year-old lady with a BMI of 26 is reviewed in the diabetic clinic due to poor glycaemic control. She is currently being treated with gliclazide 160mg bd. Her latest bloods show:

Na ⁺	139 mmol/l
K ⁺	4.1 mmol/l
Urea	8.4 mmol/l
Creatinine	180 μ mol/l
ALT	25 iu/l
γ GT	33 iu/l
HbA1c	9.4%

Which one of the following medications should be added next?

- ☐ A. Guar gum
-  ☒ B. Pioglitazone
- ☐ C. Metformin
- ☐ D. Acarbose
- ☐ E. Repaglinide

Next question

Given that she is overweight metformin would be a natural choice to add. The creatinine however is elevated so pioglitazone is the next best option.

One possible drawback of using pioglitazone is that it may lead to weight gain, especially given her BMI is already 26

Thiazolidinediones

Thiazolidinediones are a new class of agents used in the treatment of type 2 diabetes mellitus. They are agonists to the PPAR-gamma receptor and reduce peripheral insulin resistance. Rosiglitazone was withdrawn in 2010 following concerns about the cardiovascular side-effect profile.

The PPAR-gamma receptor is an intracellular nuclear receptor. Its natural ligands are free fatty acids and it is thought to control adipocyte differentiation and function.

Adverse effects

- weight gain
- liver impairment: monitor LFTs
- fluid retention - therefore contraindicated in heart failure. The risk of fluid retention is increased if the patient also takes insulin
- recent studies have indicated an increased risk of fractures
- bladder cancer: recent studies have showed an increased risk of bladder cancer in patients taking pioglitazone (hazard ratio 2.64)

NICE guidance on thiazolidinediones

- only continue if there is a reduction of > 0.5 percentage points in HbA1c in 6 months



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Next

A 52-year-old obese lady with type 2 diabetes mellitus is interested in changing her diet. Which one of the following foods has the highest glycaemic index?



A. Baked potato



B. Apple



C. Peanut



D. Digestive biscuit



E. Brown rice

Next question

Whilst white rice has a glycaemic index of 87 brown rice has a much lower value of 58

Glycaemic index

The glycaemic index (GI) describes the capacity of a food to raise blood glucose compared with glucose in normal glucose-tolerant individuals. Foods with a high GI may be associated with an increased risk of obesity and the post-prandial hyperglycaemia associated with such foods may also increase the risk of type 2 diabetes mellitus.

Classification	Examples
High GI	White rice (87), baked potato (85), white bread (70)
Medium GI	Couscous (65), boiled new potato (62), digestive biscuit (59), brown rice (58)
Low GI	Fruit and vegetables, peanuts

The glycaemic index is shown in brackets. Glucose, by definition, would have a glycaemic index of 100





Question 65 of 136

Next

A 40-year-old woman complains of feeling tired all the time and putting on weight. On examination a diffuse, non-tender goitre is noted. Blood tests are ordered:

TSH	15.1 mU/l
Free T4	7.1 pmol/l
ESR	14 mm/hr
Anti-TSH receptor stimulating antibodies	Negative
Anti-thyroid peroxidase antibodies	Positive

What is the most likely diagnosis?

- | | |
|---|---|
| <input type="radio"/> | A. Pituitary failure |
| <input type="radio"/> | B. Primary atrophic hypothyroidism |
|  | <input type="radio"/> C. De Quervain's thyroiditis |
|  | <input checked="" type="radio"/> D. Hashimoto's thyroiditis |
| <input type="radio"/> | E. Grave's disease |

Next question

Hashimoto's thyroiditis = hypothyroidism + goitre + anti-TPO

This patient has Hashimoto's thyroiditis, as evidenced by the hypothyroidism, goitre and anti-thyroid peroxidase antibodies. De Quervain's thyroiditis typically causes a painful goitre and a raised ESR. Around 90% of patients with Grave's disease have anti-TSH receptor stimulating antibodies.

Hashimoto's thyroiditis

Hashimoto's thyroiditis is an autoimmune disorder of the thyroid gland. It is typically associated with hypothyroidism although there may be a transient thyrotoxicosis in the acute phase. It is 10 times more common in women

Features

- features of hypothyroidism
- goitre: firm, non-tender
- anti-thyroid peroxidase and also anti-Tg antibodies



Question 66 of 136

Next

A 24-year-old man is prescribed an extended course of oral prednisolone following a flare of ulcerative colitis. Which one of the following side-effects is most associated with prolonged corticosteroid use?

- ✓ ☒ A. Insomnia
- ☐ B. Thrombocytopaenia
- ☐ C. Hypotension
- ☐ D. Bronchospasm
- ☐ E. Hyperkalaemia

[Next question](#)

Psychiatric problems are common with longer term steroid use.

Corticosteroids

Corticosteroids are amongst the most commonly prescribed therapies in clinical practice. They are used both systemically (oral or intravenous) or locally (skin creams, inhalers, eye drops, intra-articular). They augment and in some cases replace the natural glucocorticoid and mineralocorticoid activity of endogenous steroids.

The relative glucocorticoid and mineralocorticoid activity of commonly used steroids is shown below:

Minimal glucocorticoid activity, very high mineralocorticoid activity,	Glucocorticoid activity, high mineralocorticoid activity,	Predominant glucocorticoid activity, low mineralocorticoid activity	Very high glucocorticoid activity, minimal mineralocorticoid activity
Fludrocortisone	Hydrocortisone	Prednisolone	Dexamethasone Betmethasone

Side-effects

The side-effects of corticosteroids are numerous and represent the single greatest limitation on their usage. Side-effects are more common with systemic and prolonged therapy.

Glucocorticoid side-effects

- endocrine: impaired glucose regulation, increased appetite/weight gain, hirsutism, hyperlipidaemia
- Cushing's syndrome: moon face, buffalo hump, striae
- musculoskeletal: osteoporosis, proximal myopathy, avascular necrosis of the femoral head
- immunosuppression: increased susceptibility to severe infection, reactivation of tuberculosis
- psychiatric: insomnia, mania, depression, psychosis
- gastrointestinal: peptic ulceration, acute pancreatitis
- ophthalmic: glaucoma, cataracts
- suppression of growth in children
- intracranial hypertension

Mineralocorticoid side-effects

- fluid retention
- hypertension

Selected points on the use of corticosteroids:

- patients on long-term steroids should have their doses doubled during intercurrent illness
- the BNF suggests gradual withdrawal of systemic corticosteroids if patients have: received more than 40mg prednisolone daily for more than one week, received more than 3 weeks treatment or recently received repeated courses



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Next

One of your patients is diagnosed with having the metabolic syndrome. Which one of the following is associated with this condition?



<input type="radio"/>	A. Endometriosis
<input type="radio"/>	B. Hypothyroidism
<input type="radio"/>	C. Asymptomatic rise in amylase levels

- | | |
|----------------------------------|----------------------------|
| <input type="radio"/> | D. Elevated albumin levels |
| <input checked="" type="radio"/> | E. Raised uric acid levels |

Next question

Metabolic syndrome

Unfortunately there are a number of competing definitions of the metabolic syndrome around at the present time. It is thought that the key pathophysiological factor is insulin resistance.

SIGN recommend using criteria similar to those from the American Heart Association. The similarity of the International Diabetes Federation criteria should be noted. For a diagnosis of metabolic syndrome at least 3 of the following should be identified:

- elevated waist circumference: men > 102 cm, women > 88 cm
- elevated triglycerides: > 1.7 mmol/L
- reduced HDL: < 1.03 mmol/L in males and < 1.29 mmol/L in females
- raised blood pressure: > 130/85 mmHg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

The International Diabetes Federation produced a consensus set of diagnostic criteria in 2005, which are now widely in use. These require the presence of central obesity (defined as waist circumference > 94cm for Europid men and > 80cm for Europid women, with ethnicity specific values for other groups) plus any two of the following four factors:

- raised triglycerides level: > 1.7 mmol/L, or specific treatment for this lipid abnormality
- reduced HDL cholesterol: < 1.03 mmol/L in males and < 1.29 mmol/L in females, or specific treatment for this lipid abnormality
- raised blood pressure: > 130/85 mm Hg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

In 1999 the World Health Organization produced diagnostic criteria which required the presence of diabetes mellitus, impaired glucose tolerance, impaired fasting glucose or insulin resistance, AND two of the following:

- blood pressure: > 140/90 mmHg

- dyslipidaemia: triglycerides: > 1.695 mmol/L and/or high-density lipoprotein cholesterol (HDL-C) < 0.9 mmol/L (male), < 1.0 mmol/L (female)
- central obesity: waist:hip ratio > 0.90 (male), > 0.85 (female), and/or body mass index > 30 kg/m²
- microalbuminuria: urinary albumin excretion ratio > 20 mg/min or albumin:creatinine ratio > 30 mg/g

Other associated features include:

- raised uric acid levels
- non-alcoholic fatty liver disease
- polycystic ovarian syndrome



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Next

A 54-year-old man with type 2 diabetes mellitus is started on exenatide. Which one of the following statements regarding exenatide is incorrect?



<input type="radio"/>	A. Typically results in weight loss
<input type="radio"/>	B. May be combined with a sulfonylurea
<input checked="" type="radio"/>	C. The major adverse effect is flu-like symptoms
<input type="radio"/>	D. May be combined with metformin
<input type="radio"/>	E. Must be given by subcutaneous injection

Next question

Exenatide causes vomiting

The major adverse effect is nausea and vomiting

Diabetes mellitus: GLP-1 and the new drugs

A number of new drugs to treat diabetes mellitus have become available in recent years. Much research has focused around the role of glucagon-like peptide-1 (GLP-1), a hormone released by the small intestine in response to an oral glucose load

Whilst it is well known that insulin resistance and insufficient B-cell compensation occur other effects are also seen in type 2 diabetes mellitus (T2DM). In normal physiology an oral glucose load results in a greater release of insulin than if the same load is given intravenously - this known as the incretin effect. This effect is largely mediated by GLP-1 and is known to be decreased in T2DM.

Increasing GLP-1 levels, either by the administration of an analogue (glucagon-like peptide-1, GLP-1 mimetics, e.g. exenatide) or inhibiting its breakdown (dipeptidyl peptidase-4 ,DPP-4 inhibitors - the gliptins), is therefore the target of two recent classes of drug.

Glucagon-like peptide-1 (GLP-1) mimetics (e.g. exenatide)

Exenatide is an example of a glucagon-like peptide-1 (GLP-1) mimetic. These drugs increase insulin secretion and inhibit glucagon secretion. One of the major advances of GLP-1 mimetics is that they typically result in weight loss, in contrast to many medications such as insulin, sulfonylureas and thiazolidinediones.

Exenatide must be given by subcutaneous injection within 60 minutes before the morning and evening meals. It should not be given after a meal.

Liraglutide is the other GLP-1 mimetic currently available. One the main advantages of liraglutide over exenatide is that it only needs to be given once a day.

Both exenatide and liraglutide may be combined with metformin and a sulfonylurea. Standard release exenatide is also licensed to be used with basal insulin alone or with metformin. Please see the BNF for a more complete list of licensed indications.

NICE state the following:

Consider adding exenatide to metformin and a sulfonylurea if:

- *BMI \geq 35 kg/m² in people of European descent and there are problems associated with high weight, or*
- *BMI $<$ 35 kg/m² and insulin is unacceptable because of occupational implications or weight loss would benefit other comorbidities.*

NICE like patients to have achieved a 1% reduction in HbA1c and 3% weight loss after 6 months to justify the ongoing prescription of GLP-1 mimetics.

The major adverse effect of GLP-1 mimetics is nausea and vomiting. The Medicines and Healthcare products Regulatory Agency has issued specific warnings on the use of exenatide, reporting that is has been linked to severe pancreatitis in some patients.

Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. Vildagliptin, sitagliptin)

Key points

- oral preparation
- trials to date show that the drugs are relatively well tolerated with no increased incidence of hypoglycaemia
- do not cause weight gain

NICE guidelines on DPP-4 inhibitors

- continue DPP-4 inhibitor only if there is a reduction of > 0.5 percentage points in HbA1c in 6 months
- NICE suggest that a DPP-4 inhibitor might be preferable to a thiazolidinedione if further weight gain would cause significant problems, a thiazolidinedione is contraindicated or the person has had a poor response to a thiazolidinedione



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Next

A 78-year-old man with type 2 diabetes mellitus is reviewed in the diabetes clinic. He is currently taking metformin 1g bd. He also has a history of hypertension and hypothyroidism. His HbA1c one year ago was 44 mmol/mol (6.2%). The most recent test is reported as 46 mmol/mol (6.4%). What is the most appropriate next step in management?



A. Increase dose of metformin

	<input type="radio"/>	B. Add glimepiride
	<input type="radio"/>	C. Add sitagliptin
	<input type="radio"/>	D. Add pioglitazone
	<input checked="" type="radio"/>	E. Make no changes

Next question

This man has acceptable glycaemic control, both in terms of NICE guidance and more recent evidence looking at the harms of overzealous glycaemic control. No changes should therefore be made for now.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)

- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 52-year-old man has a set of fasting bloods as part of a work-up for hypertension. The fasting glucose comes back as 6.5 mmol/l. The test is repeated and reported as 6.7 mmol/l. He says he feels constantly tired but denies any polyuria or polydipsia. How should these results be interpreted?



A. Impaired fasting glycaemia



B. Suggestive of diabetes mellitus but not diagnostic



C. Diabetes mellitus



D. Normal



E. Impaired glucose tolerance

Next question

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus

- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:



- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



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Next

A patient is diagnosed with type 2 diabetes mellitus. Following NICE guidelines, what target should be set for the HbA1c?

- | | | |
|---|----------------------------------|---|
|  | <input type="radio"/> | A. Agree target with patient but generally aim for 7.0% |
| | <input type="radio"/> | B. Agree target with patient but generally aim for 6.0% |
| | <input type="radio"/> | C. As low as possible |
|  | <input checked="" type="radio"/> | D. Agree target with patient but generally aim for 6.5% |
| | <input type="radio"/> | E. 6.5% |

Next question

The April 2010 AKT feedback report stated: 'Items concerning routine management of type 2 diabetes caused some problem, especially with regard to the wider management of cardiovascular risks.'

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 52-year-old woman who was diagnosed as having primary atrophic hypothyroidism 12 months ago is reviewed following recent thyroid function tests (TFTs):

TSH	12.5 mU/l
Free T4	14 pmol/l

She is currently taking 75mcg of levothyroxine once a day. How should these results be interpreted?



- ☒ A. Poor compliance with medication
- ☐ B. Her thyroxine does needs to be increased
- ☐ C. Evidence of recent systemic steroid therapy
- ☐ D. She is on the correct dose
- ☐ E. T4 to T3 conversion disorder

Next question

The TSH level is high. This implies that over recent days/weeks her body is thyroxine deficient. However, her free T4 is within normal range. The most likely explanation is that she started taking the thyroxine properly just before the blood test. This would correct the thyroxine level but the TSH takes longer to normalise.

Thyroid function tests

The interpretation of thyroid function tests is usually straightforward:

Diagnosis	TSH	Free T4	Notes
Thyrotoxicosis (e.g. Graves' disease)	Low	High	In T3 thyrotoxicosis the free T4 will be normal
Primary hypothyroidism (primary atrophic hypothyroidism)	High	Low	
Secondary hypothyroidism	Low	Low	Replacement steroid therapy is required

Diagnosis	TSH	Free T4	Notes
			prior to thyroxine
Sick euthyroid syndrome*	Low**	Low	Common in hospital inpatients T3 is particularly low in these patients
Subclinical hypothyroidism	High	Normal	
Poor compliance with thyroxine	High	Normal	
Steroid therapy	Low	Normal	

*now referred to as non-thyroidal illness

**TSH may be normal in some cases



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Next

Which one of the following statements regarding metformin is true?



- ☒ A. Should be stopped in a patient admitted with a myocardial infarction
- ☐ B. Hypoglycaemia is a recognised adverse effect
- ☐ C. May cause a metabolic alkalosis
- ☐ D. May aggravate necrobiosis lipoidica diabetorum
- ☐ E. Increases vitamin B12 absorption

Next question

Metformin should be stopped following a myocardial infarction due to the risk of lactic acidosis. It may be introduced at a later date. Diabetic control may be achieved through the use of a insulin/dextrose infusion (e.g. the DIGAMI regime)

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome



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Next

Your next patient is a 74-year-old woman who is known to have type 2 diabetes mellitus. Her blood pressure has been borderline for a number of weeks now but you have decided she would benefit from treatment. Her latest blood pressure is 146/88 mmHg, HbA1c is 7.5% and her BMI is 25 kg/m². What is the most appropriate drug to prescribe?



- | | |
|----------------------------------|------------------------|
| <input type="radio"/> | A. Bisoprolol |
| <input type="radio"/> | B. Bendroflumethiazide |
| <input type="radio"/> | C. Amlodipine |
| <input checked="" type="radio"/> | D. Ramipril |
| <input type="radio"/> | E. Orlistat |

Next question

Hypertension in diabetics - ACE-inhibitors are first-line regardless of age

Diabetes mellitus: hypertension management

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

A 2013 Cochrane review casted doubt on the wisdom of lower blood pressure targets for patients with diabetes. It compared patients who had tight blood pressure control (targets < 130/85 mmHg) with more relaxed control (< 140-160/90-100 mmHg). Patients who were more tightly controlled had a slightly reduced rate of stroke but otherwise outcomes were not significantly different.

Because ACE-inhibitors have a renoprotective effect in diabetes they are the first-line antihypertensives recommended for NICE. Patients of African or Caribbean family origin should be

offered an ACE-inhibitor plus either a thiazide diuretic or calcium channel blocker. Further management then reverts to that of non-diabetic patients, as discussed earlier in the module.

Remember that autonomic neuropathy may result in more postural symptoms in patients taking antihypertensive therapy.

The routine use of beta-blockers in uncomplicated hypertension should be avoided, particularly when given in combination with thiazides, as they may cause insulin resistance, impair insulin secretion and alter the autonomic response to hypoglycaemia.



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Next

A 45-year-old female presents to her GP with a two month history of lethargy. Blood tests reveal the following:

Na ⁺	128 mmol/l
K ⁺	5.6 mmol/l
Urea	5.3 mmol/l
Creatinine	99 µmol/l
Total T4	66 nmol/l (70 - 140 nmol/l)

Which one of the following investigations is most likely to reveal the diagnosis?



A. Serum glucose



B. TSH



C. Free T4



D. Overnight dexamethasone suppression test



E. Short synacthen test

Next question

The short synacthen test is the best test to diagnose Addison's disease

Hyponatraemia and hyperkalaemia in a patient with lethargy is highly suggestive of Addison's disease. The thyroxine level is slightly low and she may indeed have co-existing hypothyroidism but this would not explain the hyperkalaemia

Addison's disease: investigations

In a patient with suspected Addison's disease the definite investigation is a ACTH stimulation test (short Synacthen test). Plasma cortisol is measured before and 30 minutes after giving Synacthen 250ug IM. Adrenal autoantibodies such as anti-21-hydroxylase may also be demonstrated

Associated electrolyte abnormalities

- hyperkalaemia
- hyponatraemia
- hypoglycaemia
- metabolic acidosis



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Next

A 78-year-old man with type 2 diabetes mellitus is reviewed in the diabetes clinic. He is currently taking metformin 1g bd. He also has a history of hypertension and hypothyroidism. His HbA1c a year ago was 44 mmol/mol (6.2%) to 46 mmol/mol (6.4%). What is the most appropriate next step in management?

- | | |
|----------------------------------|-------------------------------|
| <input type="radio"/> | A. Increase dose of metformin |
| <input type="radio"/> | B. Add glimepiride |
| <input checked="" type="radio"/> | C. Add sitagliptin |
| <input type="radio"/> | D. Add pioglitazone |



E. Make no changes

Next question

This man has acceptable glycaemic control, both in terms of NICE guidance and more recent evidence looking at the harms of overzealous glycaemic control. No changes should therefore be made for now.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

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HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
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Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
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Starting insulin

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- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



A 65-year-old man with a history of ischaemic heart disease is admitted with chest pain. The 12-hour troponin T is negative. During admission his medications were altered to reduce the risk of cardiovascular disease and to treat previously undiagnosed type 2 diabetes mellitus. Shortly after discharge he presents to his GP complaining of diarrhoea. Which one of the following medications is most likely to be responsible?

- | | | |
|---|----------------------------------|------------------|
|  | <input type="radio"/> | A. Gliclazide |
| | <input type="radio"/> | B. Clopidogrel |
| | <input type="radio"/> | C. Rosiglitazone |
|  | <input checked="" type="radio"/> | D. Metformin |
| | <input type="radio"/> | E. Atorvastatin |

Next question

Gastrointestinal problems are a common side-effect of many medications but are frequently seen in patients taking metformin

If this patient had a raised troponin T then metformin may not be suitable as it is contraindicated following recent episodes of tissue hypoxia.

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%

- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome



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Next

A 54-year-old man is reviewed shortly after being diagnosed with hypertension. as part of his work-up he had a series of blood tests to screen for other risk factors:

Na^+	142 mmol/l
K^+	3.9 mmol/l
Urea	6.2 mmol/l
Creatinine	$91 \mu\text{mol/l}$

Fasting glucose 7.7 mmol/l

Total cholesterol 7.2 mmol/l

Based on the fasting glucose result you arrange a HbA1c:

HbA1c 31 mmol/mol (5.0%)

Which one of the following would explain the discrepancy between the HbA1c and fasting glucose levels?

- ☐ A. Vitamin B12 deficiency
- ☒ B. Conn's syndrome
- ☐ C. Raised cholesterol level
- ☒ D. Sickle-cell anaemia
- ☐ E. A history of alcohol excess

[Next question](#)

Glycosylated haemoglobin

Glycosylated haemoglobin (HbA1c) is the most widely used measure of long-term glycaemic control in diabetes mellitus. HbA1c is produced by the glycosylation of haemoglobin at a rate proportional to the glucose concentration. The level of HbA1c therefore is dependant on

- red blood cell lifespan
- average blood glucose concentration

A number of conditions can interfere with accurate HbA1c interpretation:

Lower-than-expected levels of HbA1c (due to reduced red blood cell lifespan)	Higher-than-expected levels of HbA1c (due to increased red blood cell lifespan)
Sickle-cell anaemia GP6D deficiency Hereditary spherocytosis	Vitamin B12/folic acid deficiency Iron-deficiency anaemia Splenectomy

HbA1c is generally thought to reflect the blood glucose over the previous '2-3 months' although there is some evidence it is weighed more strongly to glucose levels of the past 2-4 weeks

The relationship between HbA1c and average blood glucose is complex but has been studied by the Diabetes Control and Complications Trial (DCCT). A new internationally standardised method for reporting HbA1c has been developed by the International Federation of Clinical Chemistry (IFCC). This will report HbA1c in mmol per mol of haemoglobin without glucose attached.

HbA1c (%)	Average plasma glucose (mmol/l)	IFCC-HbA1c (mmol/mol)
5	5.5	
6	7.5	42
7	9.5	53
8	11.5	64
9	13.5	75
10	15.5	
11	17.5	
12	19.5	

From the above we can see that average plasma glucose = $(2 * \text{HbA1c}) - 4.5$



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Next

A 52-year-old man presents to his GP as he is concerned about a discharge from his nipples. Which one of the following drugs is most likely to be responsible?



A. Ranitidine

	<input type="radio"/>	B. Isoniazid
	<input type="radio"/>	C. Digoxin
	<input type="radio"/>	D. Spironolactone
	<input checked="" type="radio"/>	E. Chlorpromazine

Next question

Each of the other four drugs may be associated with gynaecomastia rather than galactorrhoea.

Prolactin and galactorrhoea

Prolactin is secreted by the anterior pituitary gland with release being controlled by a wide variety of physiological factors. Dopamine acts as the primary prolactin releasing inhibitory factor and hence dopamine agonists such as bromocriptine may be used to control galactorrhoea. It is important to differentiate the causes of galactorrhoea (due to the actions of prolactin on breast tissue) from those of gynaecomastia

Features of excess prolactin

- men: impotence, loss of libido, galactorrhoea
- women: amenorrhoea, galactorrhoea

Causes of raised prolactin

- prolactinoma
- pregnancy
- oestrogens
- physiological: stress, exercise, sleep
- acromegaly: 1/3 of patients
- polycystic ovarian syndrome
- primary hypothyroidism (due to thyrotrophin releasing hormone (TRH) stimulating prolactin release)

Drug causes of raised prolactin

- metoclopramide, domperidone

- phenothiazines
- haloperidol
- very rare: SSRIs, opioids



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Next

A 62-year-old HGV driver is reviewed. He was diagnosed last year with type 2 diabetes mellitus. Following weight loss and metformin his HbA1c has decreased from 8.9% to 8.4%. What is the most suitable next step in management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Add exenatide |
| <input type="radio"/> | B. Make no changes to management |
| <input checked="" type="radio"/> | C. Add gliclazide |
| <input type="radio"/> | D. Stop metformin for a period to ensure hypoglycaemic awareness is not lost |
| <input checked="" type="radio"/> | E. Add pioglitazone |

Next question

Pioglitazone is the best option here as it would not put him at risk of hypoglycaemia, which obviously could be dangerous given his job. The NICE guidelines would also support the use of a DPP-4 inhibitor (sitagliptin or vildagliptin) in this situation where the risk of hypoglycaemia must be avoided.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids

- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)

- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis

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Next

Theme: Diabetes mellitus: diagnosis

A.	Normal
B.	Diabetes mellitus
C.	Impaired fasting glucose
D.	Samples mixed up
E.	Impaired glucose tolerance
F.	Suggests diabetes mellitus but further testing needed
G.	Impaired fasting glucose and impaired glucose tolerance

Please select the diagnosis for each of the following scenarios:

81. After fasting overnight a patients urine sample shows glucose ++, no ketones

 You answered Normal

The correct answer is Suggests diabetes mellitus but further testing needed

82. A patient who presents with polydipsia has a non-fasting glucose sample taken which is reported as 11.4 mmol/l

 You answered Normal

The correct answer is Diabetes mellitus

83. A 62-year-old woman presents with polyuria and lethargy. Her HbA1c is 6.7%

 You answered Normal

The correct answer is Diabetes mellitus

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes. A HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus in a symptomatic patient.

[Next question](#)

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)



Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



A 62-year-old man presents four weeks after initiating metformin for type 2 diabetes mellitus. His body mass index is 27.5 kg/m². Despite slowly titrating the dose up to 500mg tds he has experienced significant diarrhoea. He has tried reducing the dose back down to 500mg bd but his symptoms persisted. What is the most appropriate action?

- | | | |
|---|----------------------------------|--|
|  | <input type="radio"/> | A. Switch to pioglitazone 15mg od |
| | <input type="radio"/> | B. Switch to gliclazide 40mg od |
|  | <input checked="" type="radio"/> | C. Start modified release metformin 500mg od with evening meal |
| | <input type="radio"/> | D. Add loperamide as required |
| | <input type="radio"/> | E. Arrange colonoscopy |

Next question

If a patient is intolerant to standard metformin then modified-release preparations should be tried. There is some evidence that these produce fewer gastrointestinal side-effects in patients intolerant of standard-release metformin.

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams


**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome

Next

A 63-year-old woman presents to her GP for review. Her past medical history includes hypothyroidism for which she currently takes levothyroxine 100mcg. She is currently well and has no symptoms of note. Her last thyroid function tests (TFTs) 12 months ago on this dose were normal.

Free T4	18.5 pmol/l
TSH	0.1 mu/l

What is the most appropriate action?

-  ☒ A. Make no changes to the current dose
- ☐ B. Increase dose to levothyroxine 150mcg od



C. Decrease dose to levothyroxine 75mcg od



D. Decrease dose to levothyroxine 50mcg od



E. Add carbimazole 10mg od

Next question

The most recent TFTs show a suppressed TSH indicating over replacement. Even though she is asymptomatic the dose should be decreased to reduce the risk of osteoporosis and atrial fibrillation. The BNF recommends adjusting the dose by 25mcg in this age group.

Hypothyroidism: management

Key points

- initial starting dose of levothyroxine should be lower in elderly patients and those with ischaemic heart disease. The BNF recommends that for patients with cardiac disease, severe hypothyroidism or patients over 50 years the initial starting dose should be 25mcg od with dose slowly titrated. Other patients should be started on a dose of 50-100mcg od
- following a change in thyroxine dose thyroid function tests should be checked after 8-12 weeks
- the therapeutic goal is 'normalisation' of the thyroid stimulating hormone (TSH) level. As the majority of unaffected people have a TSH value 0.5-2.5 mU/l it is now thought preferable to aim for a TSH in this range
- there is no evidence to support combination therapy with levothyroxine and liothyronine

Side-effects of thyroxine therapy

- hyperthyroidism: due to over treatment
- reduced bone mineral density
- worsening of angina
- atrial fibrillation

Interactions

- iron: absorption of levothyroxine reduced, give at least 2 hours apart



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Next

A 65 year old female with type 2 diabetes attends clinic for review. She currently takes metformin 1g twice daily and gliclazide 160mg twice daily. Her body mass index (BMI) is recorded at 30 kg/m². Bloods are given.

Sodium	142mmol/L
Potassium	3.8mmol/L
Urea	6.3mmol/L
Creatinine	128mmol/L
eGFR	48ml/min/1.73m ²
HbA1c	7.2% (55mmol/mol)

Given the above information what adjustment to current treatment should be made?



- ☐ A. Stop metformin and continue gliclazide
- ☐ B. Stop metformin and start insulin
- ☒ C. No change to medication
- ☐ D. Add insulin
- ☐ E. Add thiazolidinedione

Next question

This is quite a straightforward question which just requires a few pieces of specific knowledge. The intricacies of glucose lower therapy in type 2 diabetes however has a lot of caveats and can be reviewed via the link given.

As a general rule, first and second line therapy are recommended when HbA1c > 6.5%, and third line therapy and or insulin are recommended only when HbA1c >7.5%. Metformin tends to be first line due to the beneficial effect on weight. Sulphonylureas remain second line for the most part unless not tolerated or they pose an unacceptable risk of hypoglycaemia. When sulphonylureas are contraindicated or not tolerated, then alternatives such as DPP4 inhibitors or thiazolidinediones may be considered. When adding to metformin plus a sulphonylurea, insulin remains next line, with alternatives such as DPP4 inhibitors being recommended when insulin is 'unacceptable or inappropriate' (usually patient avoidance of injections or when weight is a problem) and should only be continued if effective (due to relatively high cost).

When considering renal function and metformin it is recommended that this is stopped when creatinine exceeds 150mmol/L or eGFR < 30ml/min/1.73m². Caution is recommended between 30 - 45ml/min/1.73m². The caution here usually refers to the rate of change/deterioration in function for example if eGFR has remained at 33ml/min/1.73m² for 6 months it may be reasonable to continue but if it has progressed from 50 to 38ml/min/1.73m² it is likely that it should be discontinued due to the risk of lactic acidosis.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
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Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
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Starting insulin

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Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

Which one of the following drugs is not associated with galactorrhoea?

☐

A. Metoclopramide

☒

B. Bromocriptine

☐

C. Chlorpromazine

☐

D. Haloperidol

☐

E. Domperidone

[Next question](#)

Bromocriptine is a treatment for galactorrhoea, rather than a cause

Prolactin and galactorrhoea

Prolactin is secreted by the anterior pituitary gland with release being controlled by a wide variety of physiological factors. Dopamine acts as the primary prolactin releasing inhibitory factor and hence dopamine agonists such as bromocriptine may be used to control galactorrhoea. It is important to differentiate the causes of galactorrhoea (due to the actions of prolactin on breast tissue) from those of gynaecomastia

Features of excess prolactin

- men: impotence, loss of libido, galactorrhoea
- women: amenorrhoea, galactorrhoea

Causes of raised prolactin

- prolactinoma
- pregnancy
- oestrogens
- physiological: stress, exercise, sleep
- acromegaly: 1/3 of patients
- polycystic ovarian syndrome
- primary hypothyroidism (due to thyrotrophin releasing hormone (TRH) stimulating prolactin release)

Drug causes of raised prolactin

- metoclopramide, domperidone
- phenothiazines
- haloperidol
- very rare: SSRIs, opioids



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Next

A 45-year-old man is reviewed in the diabetes clinic. The following results are obtained:

Urinalysis	NAD
HbA1c	8.6%

Gliclazide is added to the metformin he already takes. What is the minimum time period after which the HbA1c should be repeated ?

- ☐ A. 6 months
- ☐ B. 1 month
- ☒ C. 2 weeks
- ☒ D. 2 months
- ☐ E. 4 months

Next question

HbA1C - recheck after 2-3 months

NICE advise monitoring HbA1c '2-6 monthly (according to individual needs) until stable on unchanging therapy'.

Glycosylated haemoglobin

Glycosylated haemoglobin (HbA1c) is the most widely used measure of long-term glycaemic control in diabetes mellitus. HbA1c is produced by the glycosylation of haemoglobin at a rate proportional to the glucose concentration. The level of HbA1c therefore is dependant on

- red blood cell lifespan
- average blood glucose concentration

A number of conditions can interfere with accurate HbA1c interpretation:

Lower-than-expected levels of HbA1c (due to reduced red blood cell lifespan)	Higher-than-expected levels of HbA1c (due to increased red blood cell lifespan)
Sickle-cell anaemia GP6D deficiency Hereditary spherocytosis	Vitamin B12/folic acid deficiency Iron-deficiency anaemia Splenectomy

HbA1c is generally thought to reflect the blood glucose over the previous '2-3 months' although there is some evidence it is weighed more strongly to glucose levels of the past 2-4 weeks

The relationship between HbA1c and average blood glucose is complex but has been studied by the Diabetes Control and Complications Trial (DCCT). A new internationally standardised method for reporting HbA1c has been developed by the International Federation of Clinical Chemistry (IFCC). This will report HbA1c in mmol per mol of haemoglobin without glucose attached.

HbA1c (%)	Average plasma glucose (mmol/l)	IFCC-HbA1c (mmol/mol)
5	5.5	
6	7.5	42
7	9.5	53
8	11.5	64
9	13.5	75
10	15.5	

11	17.5
12	19.5

From the above we can see that average plasma glucose = $(2 * \text{HbA1c}) - 4.5$



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Next

A 50-year-old man who is known to have obesity and hypertension comes for review. His current BMI is 38 kg/m² and blood pressure today is 154/92 mmHg despite ramipril and bendroflumethiazide. Lifestyle and a trial of orlistat have failed to reduce his weight. Which one of the following is the most suitable intervention?



- ☐ A. Biliopancreatic diversion with duodenal switch
- ☒ B. Laparoscopic-adjustable gastric banding
- ☐ C. Trial of sibutramine
- ☐ D. Referral for counselling to discuss his excessive eating
- ☐ E. Sleeve gastrectomy

Next question

Laparoscopic-adjustable gastric banding is the intervention of choice in patients with a BMI < 40 kg/m².

Sibutramine has recently been withdrawn due to concerns about a possible increased risk of cardiovascular events.

Obesity: bariatric surgery

The use of bariatric surgery in the management of obesity has developed significantly over the past decade. It is now recognised that for many obese patients who fail to lose weight with lifestyle and drug interventions the risks and expense of long-term obesity outweigh those of surgery.

NICE guidelines on bariatric surgery for adults

Consider surgery for people with severe obesity if:

- they have a BMI of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² and other significant disease (for example, type 2 diabetes mellitus, hypertension) that could be improved if they lost weight
- all appropriate non-surgical measures have failed to achieve or maintain adequate clinically beneficial weight loss for at least 6 months
- they are receiving or will receive intensive specialist management
- they are generally fit for anaesthesia and surgery
- they commit to the need for long-term follow-up

Consider surgery as a first-line option for adults with a BMI of more than 50 kg/m² in whom surgical intervention is considered appropriate; consider orlistat before surgery if the waiting time is long

Types of bariatric surgery:

- primarily restrictive: laparoscopic-adjustable gastric banding (LAGB) or sleeve gastrectomy
- primarily malabsorptive: classic biliopancreatic diversion (BPD) has now largely been replaced by biliopancreatic diversion with duodenal switch
- mixed: Roux-en-Y gastric bypass surgery

Which operation?

- LAGB produces less weight loss than malabsorptive or mixed procedures but as it has fewer complications it is normally the first-line intervention in patients with a BMI of 30-39 kg/m²
- patients with a BMI > 40 kg/m² may be considered for a gastric bypass or sleeve gastrectomy. The latter may be done as a sole procedure or as an initial procedure prior to bypass
- primarily malabsorptive procedures are usually reserved for very obese patients (e.g. BMI > 60 kg/m²)



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Next

Which one of the following statements regarding impaired glucose regulation is correct?



A. All patient should have a repeat oral glucose tolerance test every 2 years



B. Patients with impaired glucose tolerance are more likely to develop diabetes than patients with impaired fasting glycaemia



C. Impaired glucose tolerance (IGT) is defined as a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l



D. Around 1 in 20 adults in the UK have impaired glucose regulation



E. Patients should be offered pioglitazone if lifestyle changes fail to improve their glucose profile

Next question

Prediabetes and impaired glucose regulation

Prediabetes is a term which is increasingly used where there is impaired glucose levels which are above the normal range but not high enough for a diagnosis of diabetes mellitus. The term includes patients who have been labelled as having either impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Diabetes UK estimate that around 1 in 7 adults in the UK have prediabetes. Many individuals with prediabetes will progress on to developing type 2 diabetes mellitus (T2DM) and they are therefore at greater risk of microvascular and macrovascular complications.

Terminology

- Diabetes UK currently recommend using the term prediabetes when talking to patients and impaired glucose regulation when talking to other healthcare professionals
- research has shown that the term 'prediabetes' has the most impact and is most easily understood

Identification of patients with prediabetes

- NICE recommend using a validated computer based risk assessment tool for all adults aged 40 and over, people of South Asian and Chinese descent aged 25-39, and adults with conditions that increase the risk of type 2 diabetes
- patients identified at high risk should have a blood sample taken
- a fasting plasma glucose of 5.5-6.9 mmol/l or an HbA1c level of 42-47 mmol/mol (6.0-6.4%) indicates high risk

Management

- lifestyle modification: weight loss, increased exercise, change in diet
- at least yearly follow-up with blood tests is recommended
- NICE recommend metformin for adults at high risk *'whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme'*

Impaired fasting glucose and impaired glucose tolerance

There are two main types of IGR:

- impaired fasting glucose (IFG) - due to hepatic insulin resistance
- impaired glucose tolerance (IGT) - due to muscle insulin resistance
- patients with IGT are more likely to develop T2DM and cardiovascular disease than patients with IFG

Definitions

- a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)
- impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l
- people with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT

Theme: Side-effects of diabetes mellitus drugs

A.	Hypocalcaemia
B.	Diarrhoea
C.	Sinusitis
D.	Worsening of heart failure
E.	Headaches
F.	Hypoglycaemia

Select the side-effect most characteristically associated with the following drugs:

91. Metformin

✓ Diarrhoea

92. Pioglitazone

✓ Worsening of heart failure

93. Gliclazide

✓ Hypoglycaemia

Next question

Side-effects of common drugs: diabetes drugs

The table below summarises characteristic (if not necessarily the most common) side-effects of drugs used to treat diabetes mellitus

Drug	Side-effect
------	-------------

Metformin	<ul style="list-style-type: none"> ⚡ Gastrointestinal side-effects ⚡ Lactic acidosis
Sulfonylureas	<ul style="list-style-type: none"> ⚡ Hypoglycaemic episodes ⚡ Increased appetite and weight gain ⚡ Syndrome of inappropriate ADH secretion ⚡ Liver dysfunction (cholestatic)
Glitazones	<ul style="list-style-type: none"> ⚡ Weight gain ⚡ Fluid retention ⚡ Liver dysfunction ⚡ Fractures



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Next

A 60-year-old man type 1 diabetes mellitus comes for review. He has recently had laser therapy to treat proliferative retinopathy. What should his target blood pressure be?

- ☐ A. < 125/75 mmHg
- ☒ B. < 130/80 mmHg
- ☐ C. < 140/85 mmHg
- ☐ D. < 140/90 mmHg
- ☒ E. < 140/80 mmHg

Next question

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

Diabetes mellitus: hypertension management

NICE recommend the following blood pressure targets for type 2 diabetics:

- if end-organ damage (e.g. renal disease, retinopathy) < 130/80 mmHg
- otherwise < 140/80 mmHg

A 2013 Cochrane review casted doubt on the wisdom of lower blood pressure targets for patients with diabetes. It compared patients who had tight blood pressure control (targets < 130/85 mmHg) with more relaxed control (< 140-160/90-100 mmHg). Patients who were more tightly controlled had a slightly reduced rate of stroke but otherwise outcomes were not significantly different.

Because ACE-inhibitors have a renoprotective effect in diabetes they are the first-line antihypertensives recommended for NICE. Patients of African or Caribbean family origin should be offered an ACE-inhibitor plus either a thiazide diuretic or calcium channel blocker. Further management then reverts to that of non-diabetic patients, as discussed earlier in the module.

Remember that autonomic neuropathy may result in more postural symptoms in patients taking antihypertensive therapy.

The routine use of beta-blockers in uncomplicated hypertension should be avoided, particularly when given in combination with thiazides, as they may cause insulin resistance, impair insulin secretion and alter the autonomic response to hypoglycaemia.





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Next

A 52-year-old woman with suspected diabetes mellitus has an oral glucose tolerance test, following the standard WHO protocol. The following results are obtained:

Time (hours)	Blood glucose (mmol/l)
0	5.9
2	8.4

How should these results be interpreted?

- | | |
|--|--|
| <input type="radio"/> | A. Impaired fasting glucose and impaired glucose tolerance |
|  <input type="radio"/> | B. Normal |
| <input type="radio"/> | C. Diabetes mellitus |
|  <input checked="" type="radio"/> | D. Impaired glucose tolerance |
| <input type="radio"/> | E. Impaired fasting glucose |

Next question

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



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Next

A 75-year-old woman with a history of hypothyroidism is admitted to the Emergency Department following an episode of chest pain. She is diagnosed as having an acute coronary syndrome and iron-deficiency anaemia. A percutaneous coronary intervention is performed and a coronary artery stent is inserted. Endoscopies of the upper and lower gastrointestinal tract are performed and reported as normal. She is discharged on the following drugs in addition to her regular levothyroxine: aspirin, clopidogrel, ramipril, lansoprazole, simvastatin and ferrous sulphate. Six weeks later she complains of feeling tired all the time. Her GP arranges some routine blood tests:

Hb	11.9 g/dl
Platelets	155 * 10 ⁹ /l
WBC	5.2 * 10 ⁹ /l

Free T4	8.1 pmol/l
TSH	8.2 mu/l

Prior to her recent admission the TSH has been within range for the past two years. Which one of the following new drugs most likely explains the raised TSH?

- ☐ A. Simvastatin
- ☐ B. Clopidogrel
- ☒ C. Ferrous sulphate
- ☐ D. Ramipril
- ☐ E. Lansoprazole

Next question

Iron reduces the absorption of thyroxine

Hypothyroidism: management

Key points

- initial starting dose of levothyroxine should be lower in elderly patients and those with ischaemic heart disease. The BNF recommends that for patients with cardiac disease, severe hypothyroidism or patients over 50 years the initial starting dose should be 25mcg od with dose slowly titrated. Other patients should be started on a dose of 50-100mcg od
- following a change in thyroxine dose thyroid function tests should be checked after 8-12 weeks

- the therapeutic goal is 'normalisation' of the thyroid stimulating hormone (TSH) level. As the majority of unaffected people have a TSH value 0.5-2.5 mU/l it is now thought preferable to aim for a TSH in this range
- there is no evidence to support combination therapy with levothyroxine and liothyronine

Side-effects of thyroxine therapy

- hyperthyroidism: due to over treatment
- reduced bone mineral density
- worsening of angina
- atrial fibrillation

Interactions

- iron: absorption of levothyroxine reduced, give at least 2 hours apart



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Next

For patients who fast during Ramadan, which one of the following statements regarding the management of type 2 diabetes mellitus is true?

<input type="radio"/>	A. Patients taking metformin should have their doses halved during Ramadan
<input checked="" type="radio"/>	B. Sulfonylureas should be stopped during Ramadan
<input checked="" type="radio"/>	C. Around 4 out of 5 patients Muslim patients with type 2 diabetes mellitus fast during Ramadan
<input type="radio"/>	D. Short-acting carbohydrates should be taken after breaking the fast in the evening
<input type="radio"/>	E. Pioglitazone should be stopped during Ramadan

Next question

Research suggests that the vast majority (around 80%) of Muslims with diabetes will fast during Ramadan

Diabetes mellitus: Ramadan

We know that type 2 diabetes mellitus is more common in people of Asian ethnicity and a significant proportion of those patients in the UK will be Muslim. The BMJ published an excellent and comprehensive review of this issue in 2010¹.

It is important that we can give appropriate advice to Muslim patients to allow them safely observe their fast. This is particularly important from 2014 as Ramadan is due to fall in the long days of the summer months for several years henceforth.

Clearly it is a personal decision whether a patient decides to fast. It may however be worthwhile exploring the fact that people with chronic conditions are exempt from fasting or may be able to delay fasting to the shorter days of the winter months. It is however known that many Muslim patients with diabetes do not class themselves as having a chronic/serious condition which should exempt them from fasting. Around 79% of Muslim patients with type 2 diabetes mellitus fast Ramadan². There is an excellent patient information leaflet from Diabetes UK and the Muslim Council of Britain which explores these options in more detail.

If a patient with type 2 diabetes mellitus does decide to fast:

- they should try and eat a meal containing long-acting carbohydrates prior to sunrise (Suhoor)
- patients should be given a blood glucose monitor to allow them to check their glucose levels, particularly if they feel unwell
- for patients taking metformin the expert consensus is that the dose should be split one-third before sunrise (Suhoor) and two-thirds after sunset (Iftar)
- expert consensus also recommends switching once-daily sulfonylureas to after sunset. For patients taking twice-daily preparations such as gliclazide it is recommended that a larger proportion of the dose is taken after sunset
- no adjustment is needed for patients taking pioglitazone

1. Management of people with diabetes wanting to fast during Ramadan BMJ 2010;340:c3053

2. Salti I et al. Results of the Epidemiology of Diabetes and Ramadan (EPIDIAR) study. Diabetes Care 2004;27:2306-11.



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Next

A 46-year-old man presents to his GP as he is concerned about reduced libido and erectile dysfunction. His wife also reports that he has 'no energy' and comments that he has a 'permanent suntan'. During the review of systems he also complains of pains in both hands. Which one of the following investigations is most likely to reveal the diagnosis?



<input checked="" type="radio"/>	A. Ferritin
<input type="radio"/>	B. Testosterone
<input type="radio"/>	C. Cortisol
<input type="radio"/>	D. Blood glucose
<input type="radio"/>	E. Prolactin

Next question

The above patient has symptoms consistent with haemochromatosis. Diabetes mellitus itself would not normally cause reduced libido.

Haemochromatosis: features

Haemochromatosis is an autosomal recessive disorder of iron absorption and metabolism resulting in iron accumulation. It is caused by inheritance of mutations in the HFE gene on both copies of chromosome 6*. It is often asymptomatic in early disease and initial symptoms often non-specific e.g. lethargy and arthralgia

Epidemiology

- 1 in 10 people of European descent carry a mutation genes affecting iron metabolism, mainly HFE
- prevalence in people of European descent = 1 in 200

Presenting features

- early symptoms include fatigue, erectile dysfunction and arthralgia (often of the hands)
- 'bronze' skin pigmentation
- diabetes mellitus
- liver: stigmata of chronic liver disease, hepatomegaly, cirrhosis, hepatocellular deposition)
- cardiac failure (2nd to dilated cardiomyopathy)
- hypogonadism (2nd to cirrhosis and pituitary dysfunction - hypogonadotropic hypogonadism)
- arthritis (especially of the hands)

Questions have previously been asked regarding which features are reversible with treatment:

Reversible complications	Irreversible complications
<ul style="list-style-type: none"> • Cardiomyopathy • Skin pigmentation 	<ul style="list-style-type: none"> • Liver cirrhosis** • Diabetes mellitus • Hypogonadotropic hypogonadism • Arthropathy

*there are rare cases of families with classic features of genetic haemochromatosis but no mutation in the HFE gene

**whilst elevated liver function tests and hepatomegaly may be reversible, cirrhosis is not



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Next

A 54-year-old man has a routine medical for work. He is asymptomatic and clinical examination is unremarkable. Which of the following results establishes a diagnosis of impaired fasting glucose?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Fasting glucose 7.1 mmol/L |
| <input checked="" type="radio"/> | B. Fasting glucose 6.8 mmol/L |
| <input type="radio"/> | C. Glycosuria ++ |
| <input type="radio"/> | D. 75g oral glucose tolerance test 2 hour value of 8.4 mmol/L |



E. HbA1c of 6.7%

[Next question](#)

A 75g oral glucose tolerance test 2 hour value of 8.4 mmol/L would imply impaired glucose tolerance rather than impaired fasting glucose

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV

- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'



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Next

Which one of the following statements regarding metformin is false?



<input checked="" type="radio"/>	A. Does not cause hypoglycaemia
<input type="radio"/>	B. Increases insulin sensitivity
<input type="radio"/>	C. Decreases hepatic gluconeogenesis
<input checked="" type="radio"/>	D. Increases endogenous insulin secretion
<input type="radio"/>	E. Reduces GI absorption of carbohydrates

Next question

Sulphonylureas have the property of increasing endogenous insulin secretion

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome



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Next

A 55-year-old taxi driver with type 2 diabetes mellitus comes for review. When he was diagnosed 12 months ago he was started on metformin and the dose was titrated up. His IFCC-HbA1c one year ago was 75 mmol/mol (DCCT-HbA1c 9%) and is now 69 mmol/mol (8.5%). His body mass index is 31 kg/m². What is the most appropriate next step in management?



☐ A. Add exenatide



☒ B. Add sitagliptin

☐ C. Add glipizide

☐ D. Make no changes to his medication

☐ E. Add pioglitazone

Next question

His HbA1c is still significantly above target so some change to the medication is indicated.

The NICE type 2 diabetes mellitus guidelines would *generally* advocate the use of a sulfonylurea in this situation.

However, the patient is a taxi driver and overweight. A DPP-4 inhibitor such as sitagliptin would be ideal in this situation. There is no risk of hypoglycaemia and they DPP-4 inhibitors are weight neutral.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids

- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)

- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

A 53-year-old female with a history of primary atrophic hypothyroidism is assessed two months following a change in her dose of levothyroxine. Which one of the following best describes what the TSH should ideally be?



- | | |
|----------------------------------|----------------------------|
| <input type="radio"/> | A. Between 0.5 to 1.0 mU/l |
| <input checked="" type="radio"/> | B. Between 0.5 to 2.5 mU/l |
| <input type="radio"/> | C. Between 2.5 to 4.5 mU/l |
| <input type="radio"/> | D. Between 1.5 to 3.5 mU/l |
| <input type="radio"/> | E. Between 3.5 to 5.5 mU/l |

Next question

A TSH value between 0.5 to 2.5 mU/l is now considered preferable. Dosage changes should of course also take account of symptoms

Hypothyroidism: management

Key points

- initial starting dose of levothyroxine should be lower in elderly patients and those with ischaemic heart disease. The BNF recommends that for patients with cardiac disease, severe hypothyroidism or patients over 50 years the initial starting dose should be 25mcg od with dose slowly titrated. Other patients should be started on a dose of 50-100mcg od
- following a change in thyroxine dose thyroid function tests should be checked after 8-12 weeks
- the therapeutic goal is 'normalisation' of the thyroid stimulating hormone (TSH) level. As the majority of unaffected people have a TSH value 0.5-2.5 mU/l it is now thought preferable to aim for a TSH in this range
- there is no evidence to support combination therapy with levothyroxine and liothyronine

Side-effects of thyroxine therapy

- hyperthyroidism: due to over treatment
- reduced bone mineral density
- worsening of angina
- atrial fibrillation

Interactions

- iron: absorption of levothyroxine reduced, give at least 2 hours apart





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Next

An obese man presents as he is concerned about his risk of developing cardiovascular disease. Which one of the following sets of results would suggest a diagnosis of the metabolic syndrome using the Scottish Intercollegiate Guidelines Network (SIGN) criteria?



A. Waist circumference = 98 cm; fasting glucose = 7.2 mmol/l; HDL = 1.2 mmol/l

	<input type="radio"/>	B. Triglycerides = 2.0 mmol/l; HDL = 1.2 mmol/l; fasting glucose = 5.4 mmol/l
	<input type="radio"/>	C. Blood pressure = 140/90 mmHg; waist circumference = 90 cm; HDL = 1.4 mmol/l
	<input checked="" type="radio"/>	D. Waist circumference = 110 cm; fasting glucose = 5.8 mmol/l; HDL = 0.8 mmol/l
	<input type="radio"/>	E. LDL = 3.0 mmol/l; blood pressure = 130/80; fasting glucose = 6.4 mmol/l

Next question

Whilst all the results contain at least one factor consistent with the metabolic syndrome only option D contains three of the criteria and would hence support a diagnosis.

Metabolic syndrome

Unfortunately there are a number of competing definitions of the metabolic syndrome around at the present time. It is thought that the key pathophysiological factor is insulin resistance.

SIGN recommend using criteria similar to those from the American Heart Association. The similarity of the International Diabetes Federation criteria should be noted. For a diagnosis of metabolic syndrome at least 3 of the following should be identified:

- elevated waist circumference: men > 102 cm, women > 88 cm
- elevated triglycerides: > 1.7 mmol/L
- reduced HDL: < 1.03 mmol/L in males and < 1.29 mmol/L in females
- raised blood pressure: > 130/85 mmHg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

The International Diabetes Federation produced a consensus set of diagnostic criteria in 2005, which are now widely in use. These require the presence of central obesity (defined as waist circumference > 94cm for Europid men and > 80cm for Europid women, with ethnicity specific values for other groups) plus any two of the following four factors:

- raised triglycerides level: > 1.7 mmol/L, or specific treatment for this lipid abnormality
- reduced HDL cholesterol: < 1.03 mmol/L in males and < 1.29 mmol/L in females, or specific treatment for this lipid abnormality
- raised blood pressure: > 130/85 mm Hg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

In 1999 the World Health Organization produced diagnostic criteria which required the presence of diabetes mellitus, impaired glucose tolerance, impaired fasting glucose or insulin resistance, AND two of the following:

- blood pressure: > 140/90 mmHg
- dyslipidaemia: triglycerides: > 1.695 mmol/L and/or high-density lipoprotein cholesterol (HDL-C) < 0.9 mmol/L (male), < 1.0 mmol/L (female)
- central obesity: waist:hip ratio > 0.90 (male), > 0.85 (female), and/or body mass index > 30 kg/m²
- microalbuminuria: urinary albumin excretion ratio > 20 mg/min or albumin:creatinine ratio > 30 mg/g

Other associated features include:

- raised uric acid levels
- non-alcoholic fatty liver disease
- polycystic ovarian syndrome



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Next

A 57-year-old man with a history of type 2 diabetes mellitus and chronic heart failure is reviewed in the diabetes clinic. His current medication list is as follows:

metformin 1g bd
gliclazide 160mg bd
ramipril 10mg od
bisoprolol 5mg od
furosemide 40mg od
simvastatin 20mg on

His annual bloods show the following:

Na ⁺	140 mmol/l
K ⁺	3.9 mmol/l
Urea	5.2 mmol/l

Creatinine	78 μ mol/l
HbA1c	7.7% (61 mmol/mol)
Total cholesterol	4.2 mmol/l
HDL cholesterol	1.1 mmol/l

Blood pressure today is 124/78 mmHg and body mass index is 29 kg/m².

What is the most appropriate action with regards to his anti-diabetic medication?

- ☐ A. No changes to medication
-  ☐ B. Exenatide
- ☐ C. Dapagliflozin
- ☐ D. Pioglitazone
-  ☒ E. Sitagliptin

Next question

Pioglitazone should be avoided in this man due to his history of heart failure. He would also not fit the NICE criteria for exenatide.

Dapagliflozin is a new drug that has been introduced for type 2 diabetes mellitus. It is currently only prescribed by secondary care and would not be appropriate at this stage.

A HbA1c of 7.7% should be improved if possible. Sitagliptin may be added to metformin and gliclazide.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids

- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)

- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

You review a 70-year-old who has a long past medical history and is on multiple drugs. He has developed excessive amounts of breast tissue bilaterally. Which one of the following drugs is most likely to be responsible?

<input type="radio"/>	A. Tamoxifen
<input type="radio"/>	B. Terbinafine
<input checked="" type="radio"/>	C. Amiodarone
<input checked="" type="radio"/>	D. Goserelin (Zoladex)
<input type="radio"/>	E. Lymeccycline

Next question

Goserelin is a gonadorelin analogue used in the treatment of advanced prostate cancer. Tamoxifen may be used to treat gynaecomastia.

Gynaecomastia

Gynaecomastia describes an abnormal amount of breast tissue in males and is usually caused by an increased oestrogen:androgen ratio. It is important to differentiate the causes of galactorrhoea (due to the actions of prolactin on breast tissue) from those of gynaecomastia

Causes of gynaecomastia

- physiological: normal in puberty
- syndromes with androgen deficiency: Kallman's, Klinefelter's
- testicular failure: e.g. mumps
- liver disease
- testicular cancer e.g. seminoma secreting hCG
- ectopic tumour secretion
- hyperthyroidism
- haemodialysis
- drugs: see below

Drug causes of gynaecomastia

- spironolactone (most common drug cause)
- cimetidine
- digoxin
- cannabis
- finasteride
- gonadorelin analogues e.g. Goserelin, buserelin
- oestrogens, anabolic steroids

Very rare drug causes of gynaecomastia

- tricyclics
- isoniazid
- calcium channel blockers
- heroin
- busulfan
- methyl dopa

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Next

A 67-year-old man who has a history of type 2 diabetes mellitus and benign prostatic hypertrophy presents with burning pain in his feet. This has been present for the past few months and is getting gradually worse. He has tried taking duloxetine but unfortunately has received no benefit. Clinical examination is unremarkable other than diminished sensation to fine touch on both soles. What is the most suitable initial management?



- | | |
|----------------------------------|---------------------|
| <input type="radio"/> | A. Carbamazepine |
| <input type="radio"/> | B. Amitriptyline |
| <input checked="" type="radio"/> | C. Pregabalin |
| <input type="radio"/> | D. Fluoxetine |
| <input type="radio"/> | E. Sodium valproate |

Next question

Amitriptyline would normally be first choice but given his history of benign prostatic hyperplasia it is better to avoid amitriptyline due to the risk of urinary retention.

Diabetic neuropathy

NICE updated its guidance on the management of neuropathic pain in 2013. Diabetic neuropathy is now managed in the same way as other forms of neuropathic pain:

- first-line treatment: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

Gastroparesis

- symptoms include erratic blood glucose control, bloating and vomiting
- management options include metoclopramide, domperidone or erythromycin (prokinetic agents)



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Next

You receive a letter from the diabetes clinic asking you to prescribe liraglutide for a patient who currently has poor control with metformin and gliclazide. Which one of the following statements is correct?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Most patients experience modest weight gain |
| <input checked="" type="radio"/> | B. Weight loss of 4kg in a man who weighs 100kg and a HbA1c improvement of 1.2% after 6 months is acceptable |
| <input type="radio"/> | C. Gliclazide should be stopped |
| <input type="radio"/> | D. Liraglutide is given by subcutaneous injection once a week |
| <input type="radio"/> | E. Urea & electrolytes, liver function tests and amylase should be checked 4 weeks after starting treatment |

Next question

Diabetes mellitus: GLP-1 and the new drugs

A number of new drugs to treat diabetes mellitus have become available in recent years. Much research has focused around the role of glucagon-like peptide-1 (GLP-1), a hormone released by the small intestine in response to an oral glucose load

Whilst it is well known that insulin resistance and insufficient B-cell compensation occur other effects are also seen in type 2 diabetes mellitus (T2DM). In normal physiology an oral glucose load results in a greater release of insulin than if the same load is given intravenously - this known as the incretin effect. This effect is largely mediated by GLP-1 and is known to be decreased in T2DM.

Increasing GLP-1 levels, either by the administration of an analogue (glucagon-like peptide-1, GLP-1 mimetics, e.g. exenatide) or inhibiting its breakdown (dipeptidyl peptidase-4, DPP-4 inhibitors - the gliptins), is therefore the target of two recent classes of drug.

Glucagon-like peptide-1 (GLP-1) mimetics (e.g. exenatide)

Exenatide is an example of a glucagon-like peptide-1 (GLP-1) mimetic. These drugs increase insulin secretion and inhibit glucagon secretion. One of the major advances of GLP-1 mimetics is that they typically result in weight loss, in contrast to many medications such as insulin, sulfonylureas and thiazolidinediones.

Exenatide must be given by subcutaneous injection within 60 minutes before the morning and evening meals. It should not be given after a meal.

Liraglutide is the other GLP-1 mimetic currently available. One of the main advantages of liraglutide over exenatide is that it only needs to be given once a day.

Both exenatide and liraglutide may be combined with metformin and a sulfonylurea. Standard release exenatide is also licensed to be used with basal insulin alone or with metformin. Please see the BNF for a more complete list of licensed indications.

NICE state the following:

Consider adding exenatide to metformin and a sulfonylurea if:

- *BMI \geq 35 kg/m² in people of European descent and there are problems associated with high weight, or*
- *BMI < 35 kg/m² and insulin is unacceptable because of occupational implications or weight loss would benefit other comorbidities.*

NICE like patients to have achieved a 1% reduction in HbA1c and 3% weight loss after 6 months to justify the ongoing prescription of GLP-1 mimetics.

The major adverse effect of GLP-1 mimetics is nausea and vomiting. The Medicines and Healthcare products Regulatory Agency has issued specific warnings on the use of exenatide, reporting that it has been linked to severe pancreatitis in some patients.

Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. Vildagliptin, sitagliptin)

Key points

- oral preparation
- trials to date show that the drugs are relatively well tolerated with no increased incidence of hypoglycaemia

- do not cause weight gain

NICE guidelines on DPP-4 inhibitors

- continue DPP-4 inhibitor only if there is a reduction of > 0.5 percentage points in HBA1c in 6 months
- NICE suggest that a DPP-4 inhibitor might be preferable to a thiazolidinedione if further weight gain would cause significant problems, a thiazolidinedione is contraindicated or the person has had a poor response to a thiazolidinedione



Question 108 of 136

Next

A 54-year-old female is being investigated for a macrocytic anaemia. Bloods test reveal a low vitamin B12 level. Which one of the following medications may be contributing to this?

- | | |
|----------------------------------|------------------------|
| <input type="radio"/> | A. Bendroflumethiazide |
| <input type="radio"/> | B. Digoxin |
| <input checked="" type="radio"/> | C. Amiodarone |
| <input type="radio"/> | D. Sodium valproate |
| <input checked="" type="radio"/> | E. Metformin |

Next question

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome



A 55-year-old woman with type 2 diabetes mellitus is reviewed. A decision is made to start thiazolidinedione therapy. Which one of the following points is it most relevant to consider before starting treatment?

- | | |
|----------------------------------|------------------------------------|
| <input type="radio"/> | A. History of oesophageal problems |
| <input checked="" type="radio"/> | B. Fracture risk |
| <input type="radio"/> | C. History of depression |
| <input type="radio"/> | D. History of cardiac arrhythmias |
| <input type="radio"/> | E. Visual acuity |

Next question

There is increasing evidence thiazolidinediones increase the risk of fractures

Thiazolidinediones

Thiazolidinediones are a new class of agents used in the treatment of type 2 diabetes mellitus. They are agonists to the PPAR-gamma receptor and reduce peripheral insulin resistance. Rosiglitazone was withdrawn in 2010 following concerns about the cardiovascular side-effect profile.

The PPAR-gamma receptor is an intracellular nuclear receptor. Its natural ligands are free fatty acids and it is thought to control adipocyte differentiation and function.

Adverse effects

- weight gain
- liver impairment: monitor LFTs
- fluid retention - therefore contraindicated in heart failure. The risk of fluid retention is increased if the patient also takes insulin
- recent studies have indicated an increased risk of fractures
- bladder cancer: recent studies have showed an increased risk of bladder cancer in patients taking pioglitazone (hazard ratio 2.64)

NICE guidance on thiazolidinediones


- only continue if there is a reduction of > 0.5 percentage points in HbA1c in 6 months



Question 110 of 136

Next

Patients taking amiodarone are at an increased risk of thyroid dysfunction. What problems may long-term amiodarone use cause?

- ☐ A. Thyrotoxicosis
-  ☒ B. Hypothyroidism
- ☐ C. Hypothyroidism + thyroid cancer
- ☐ D. Hypothyroidism + thyrotoxicosis + thyroid cancer
-  ☐ E. Hypothyroidism + thyrotoxicosis

Next question

Amiodarone and the thyroid gland

Around 1 in 6 patients taking amiodarone develop thyroid dysfunction

Amiodarone-induced hypothyroidism

The pathophysiology of amiodarone-induced hypothyroidism (AIH) is thought to be due to the high iodine content of amiodarone causing a Wolff-Chaikoff effect*

Amiodarone may be continued if this is desirable

Amiodarone-induced thyrotoxicosis

Amiodarone-induced thyrotoxicosis (AIT) may be divided into two types:

	AIT type 1	AIT type 2
--	------------	------------

Pathophysiology	Excess iodine-induced thyroid hormone synthesis	Amiodarone-related destructive thyroiditis
Goitre	Present	Absent
Management	Carbimazole or potassium perchlorate	Corticosteroids

Unlike in AIH, amiodarone should be stopped if possible in patients who develop AIT

*an autoregulatory phenomenon where thyroxine formation is inhibited due to high levels of circulating iodide



Question 111 of 136

Next

What is target blood pressure for a 56-year-old man with type 2 diabetes mellitus who has no end-organ damage?

- ☐ A. < 125 - 75 mmHg
- ☐ B. < 130 - 75 mmHg
- ☒ C. < 130 - 80 mmHg
- ☒ D. < 140 - 80 mmHg
- ☐ E. < 140 - 85 mmHg

Next question

Type 2 diabetes blood pressure target

- no organ damage: < 140 / 80
- end-organ damage: < 130 / 80

The April 2010 AKT feedback report stated: 'Items concerning routine management of type 2 diabetes caused some problem, especially with regard to the wider management of cardiovascular risks.'

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)

- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



Question 112 of 136

Next

A 30-year-old man presents to his GP enquiring about screening for haemochromatosis as his brother was diagnosed with the condition 2 years ago. The patient is currently well with no features suggestive of haemochromatosis. What is the most appropriate investigation?

- | | |
|------------------------------------|--------------------------------------|
| <input type="radio"/> | A. Serum total iron-binding capacity |
| ✓ <input checked="" type="radio"/> | B. HFE gene analysis |
| <input type="radio"/> | C. Serum transferrin saturation |
| <input type="radio"/> | D. Serum ferritin |
| <input type="radio"/> | E. Serum iron |

Next question

Screening for haemochromatosis

- general population: transferrin saturation > ferritin
- family members: HFE genetic testing

Serum transferrin saturation is currently the preferred investigation for population screening. However, the patient has a sibling with haemochromatosis and therefore HFE gene analysis is the most suitable investigation. In clinical practice this would be combined with iron studies as well

Haemochromatosis: investigation

Haemochromatosis is an autosomal recessive disorder of iron absorption and metabolism resulting in iron accumulation. It is caused by inheritance of mutations in the HFE gene on both copies of chromosome 6*. The British Committee for Standards in Haematology (BCSH) published guidelines for the investigation and management of haemochromatosis in 2000

There is continued debate about the best investigation to screen for haemochromatosis. The 2000 BCSH guidelines suggest:

- general population: transferrin saturation is considered the most useful marker. Ferritin should also be measured but is not usually abnormal in the early stages of iron accumulation
- testing family members: genetic testing for HFE mutation

These guidelines may change as HFE gene analysis become less expensive

Diagnostic tests

- molecular genetic testing for the C282Y and H63D mutations
- liver biopsy: Perl's stain

Typical iron study profile in patient with haemochromatosis

- transferrin saturation > 55% in men or > 50% in women
- raised ferritin (e.g. > 500 ug/l) and iron
- low TIBC

Monitoring adequacy of venesection

- BSCH recommend 'transferrin saturation should be kept below 50% and the serum ferritin concentration below 50 ug/l'

Joint x-rays characteristically show chondrocalcinosis

*there are rare cases of families with classic features of genetic haemochromatosis but no mutation in the HFE gene



Question 113 of 136

Next

Which one of the following drugs used in the management of type 2 diabetes mellitus has the Medicines and Healthcare products Regulatory Agency warned is associated with an increased risk of severe pancreatitis and renal impairment?



<input type="radio"/>	A. Rosiglitazone
<input type="radio"/>	B. Metformin
<input type="radio"/>	C. Acarbose
<input checked="" type="radio"/>	D. Exenatide





E. Sitagliptin

[Next question](#)

Diabetes mellitus: GLP-1 and the new drugs

A number of new drugs to treat diabetes mellitus have become available in recent years. Much research has focused around the role of glucagon-like peptide-1 (GLP-1), a hormone released by the small intestine in response to an oral glucose load

Whilst it is well known that insulin resistance and insufficient B-cell compensation occur other effects are also seen in type 2 diabetes mellitus (T2DM). In normal physiology an oral glucose load results in a greater release of insulin than if the same load is given intravenously - this known as the incretin effect. This effect is largely mediated by GLP-1 and is known to be decreased in T2DM.

Increasing GLP-1 levels, either by the administration of an analogue (glucagon-like peptide-1, GLP-1 mimetics, e.g. exenatide) or inhibiting its breakdown (dipeptidyl peptidase-4, DPP-4 inhibitors - the gliptins), is therefore the target of two recent classes of drug.

Glucagon-like peptide-1 (GLP-1) mimetics (e.g. exenatide)

Exenatide is an example of a glucagon-like peptide-1 (GLP-1) mimetic. These drugs increase insulin secretion and inhibit glucagon secretion. One of the major advances of GLP-1 mimetics is that they typically result in weight loss, in contrast to many medications such as insulin, sulfonylureas and thiazolidinediones.

Exenatide must be given by subcutaneous injection within 60 minutes before the morning and evening meals. It should not be given after a meal.

Liraglutide is the other GLP-1 mimetic currently available. One the main advantages of liraglutide over exenatide is that it only needs to be given once a day.

Both exenatide and liraglutide may be combined with metformin and a sulfonylurea. Standard release exenatide is also licensed to be used with basal insulin alone or with metformin. Please see the BNF for a more complete list of licensed indications.

NICE state the following:

Consider adding exenatide to metformin and a sulfonylurea if:

- *BMI ≥ 35 kg/m² in people of European descent and there are problems associated with high weight, or*
- *BMI < 35 kg/m² and insulin is unacceptable because of occupational implications or weight loss would benefit other comorbidities.*

NICE like patients to have achieved a 1% reduction in HbA1c and 3% weight loss after 6 months to justify the ongoing prescription of GLP-1 mimetics.

The major adverse effect of GLP-1 mimetics is nausea and vomiting. The Medicines and Healthcare products Regulatory Agency has issued specific warnings on the use of exenatide, reporting that it has been linked to severe pancreatitis in some patients.

Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. Vildagliptin, sitagliptin)

Key points



- oral preparation
- trials to date show that the drugs are relatively well tolerated with no increased incidence of hypoglycaemia
- do not cause weight gain

NICE guidelines on DPP-4 inhibitors

- continue DPP-4 inhibitor only if there is a reduction of > 0.5 percentage points in HbA1c in 6 months
- NICE suggest that a DPP-4 inhibitor might be preferable to a thiazolidinedione if further weight gain would cause significant problems, a thiazolidinedione is contraindicated or the person has had a poor response to a thiazolidinedione



You are reviewing a 35-year-old man who has just been diagnosed with familial hypercholesterolaemia. He is concerned that his children (the youngest of whom is 7-years-old) may have inherited the condition and asks about screening. His wife has been tested and is not affected. What is the most appropriate response with respect to screening?

-  ☒ **A.** All the children should be screened now
-  ☐ **B.** All the children should be screened once they have reached 16 years of age
- ☐ **C.** All the children should be screened once they have reached 13 years of age
- ☐ **D.** All the male children should be screened once they have reached 16 years of age
- ☐ **E.** All the male children should be screened now

[Next question](#)

Familial hypercholesterolaemia

Familial hypercholesterolaemia (FH) is an autosomal dominant condition that is thought to affect around 1 in 500 people. It results in high levels of LDL-cholesterol which, if untreated, may cause early cardiovascular disease (CVD). FH is caused by mutations in the gene which encodes the LDL-receptor protein.

Clinical diagnosis is now based on the **Simon Broome criteria**:

- in adults total cholesterol (TC) > 7.5 mmol/l and LDL-C > 4.9 mmol/l or children TC > 6.7 mmol/l and LDL-C > 4.0 mmol/l, plus:
- for definite FH: tendon xanthoma in patients or 1st or 2nd degree relatives or DNA-based evidence of FH
- for possible FH: family history of myocardial infarction below age 50 years in 2nd degree relative, below age 60 in 1st degree relative, or a family history of raised cholesterol levels

Management

- the use of CVD risk estimation using standard tables is not appropriate in FH as they do not accurately reflect the risk of CVD
- referral to a specialist lipid clinic is usually required

- the maximum dose of potent statins are usually required
- first-degree relatives have a 50% chance of having the disorder and should therefore be offered screening. This includes children who should be screened by the age of 10 years if there is one affected parent
- statins should be discontinued in women 3 months before conception due to the risk of congenital defects



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Next

You are giving dietary advice to an obese patient who has been diagnosed with type 2 diabetes mellitus. Following recent NICE guidelines, which one of the following should not be encouraged?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Food products specifically targeted at diabetics |
| <input type="radio"/> | B. Initial weight loss of 5-10% |
| <input type="radio"/> | C. Limited substitution of sucrose-containing foods for other carbohydrates |
| <input type="radio"/> | D. High-fibre, low glycaemic index carbohydrates |
| <input type="radio"/> | E. Low-fat dairy products |

Next question

NICE suggest that the consumption of foods marketed specifically at diabetics should be discouraged.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids

- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)

- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis

0 / 3 Question 116-118 of 136

Next

Theme: Diabetes mellitus: management of type 2

A.	< 130/70 mmHg
B.	< 135/75 mmHg
C.	< 140/80 mmHg
D.	< 4.0 mmol/l
E.	< 3.5 mmol/l
F.	< 5.0 mmol/l
G.	Atorvastatin
H.	Ezetimibe
I.	Fenofibrate

For each one of the following select the most appropriate answer

116. Target total cholesterol for type 2 diabetics (NICE)

 You answered < 130/70 mmHg

The correct answer is < 4.0 mmol/l

117. Target blood pressure for type 2 diabetics (NICE) with no end-organ damage

 You answered < 130/70 mmHg

The correct answer is < 140/80 mmHg

118. Should be prescribed if serum triglyceride levels are > 4.5 mmol/l

 You answered < 130/70 mmHg

The correct answer is Fenofibrate

[Next question](#)

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
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- control the intake of foods containing saturated fats and trans fatty acids
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- discourage use of foods marketed specifically at people with diabetes
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*many local protocols now recommend starting metformin upon diagnosis



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Next

A 36-year-old woman presents with feeling tired and cold all the time. On examination a firm, non-tender goitre is noted. Blood tests reveal the following:

TSH	34.2 mU/l
Free T4	5.4 pmol/l

What is the most likely diagnosis?



- | | |
|----------------------------------|------------------------------------|
| <input checked="" type="radio"/> | A. Primary atrophic hypothyroidism |
| <input type="radio"/> | B. Pituitary failure |
| <input type="radio"/> | C. De Quervain's thyroiditis |
| <input type="radio"/> | D. Iodine deficiency |
| <input checked="" type="radio"/> | E. Hashimoto's thyroiditis |

Next question

Hashimoto's thyroiditis = hypothyroidism + goitre + anti-TPO

The combination of a goitre with hypothyroidism points to a diagnosis of Hashimoto's. De Quervain's thyroiditis typically causes a painful goitre.

Hashimoto's thyroiditis

Hashimoto's thyroiditis is an autoimmune disorder of the thyroid gland. It is typically associated with hypothyroidism although there may be a transient thyrotoxicosis in the acute phase. It is 10 times more common in women

Features

- features of hypothyroidism
- goitre: firm, non-tender
- anti-thyroid peroxidase and also anti-Tg antibodies



Question 120 of 136

Next

A 54-year-old man with type 2 diabetes mellitus is reviewed in clinic. He is currently taking pioglitazone, metformin, aspirin and simvastatin. Which one of the following problems is most likely to be caused by pioglitazone?



<input type="radio"/>	A. Photosensitivity
<input type="radio"/>	B. Thrombocytopaenia
<input type="radio"/>	C. Myalgia
<input checked="" type="radio"/>	D. Peripheral oedema
<input type="radio"/>	E. Hyponatraemia



Next question

Thiazolidinediones

Thiazolidinediones are a new class of agents used in the treatment of type 2 diabetes mellitus. They

are agonists to the PPAR-gamma receptor and reduce peripheral insulin resistance. Rosiglitazone was withdrawn in 2010 following concerns about the cardiovascular side-effect profile.

The PPAR-gamma receptor is an intracellular nuclear receptor. Its natural ligands are free fatty acids and it is thought to control adipocyte differentiation and function.

Adverse effects

- weight gain
- liver impairment: monitor LFTs
- fluid retention - therefore contraindicated in heart failure. The risk of fluid retention is increased if the patient also takes insulin
- recent studies have indicated an increased risk of fractures
- bladder cancer: recent studies have showed an increased risk of bladder cancer in patients taking pioglitazone (hazard ratio 2.64)

NICE guidance on thiazolidinediones

- only continue if there is a reduction of > 0.5 percentage points in HbA1c in 6 months



Question 121 of 136

Next

A 55-year-old female is reviewed in the diabetes clinic. The following results are obtained:

Urinalysis	protein +
HbA1c	10.0%

What average blood glucose level for the past 2 months is this most likely to represent?

<input type="radio"/>	A. 9
<input checked="" type="radio"/>	B. 10
<input type="radio"/>	C. 11



D. 15



E. There is no relation between HbA1c and average blood glucose

[Next question](#)

Glycosylated haemoglobin

Glycosylated haemoglobin (HbA1c) is the most widely used measure of long-term glycaemic control in diabetes mellitus. HbA1c is produced by the glycosylation of haemoglobin at a rate proportional to the glucose concentration. The level of HbA1c therefore is dependant on

- red blood cell lifespan
- average blood glucose concentration

A number of conditions can interfere with accurate HbA1c interpretation:

Lower-than-expected levels of HbA1c (due to reduced red blood cell lifespan)	Higher-than-expected levels of HbA1c (due to increased red blood cell lifespan)
Sickle-cell anaemia GP6D deficiency Hereditary spherocytosis	Vitamin B12/folic acid deficiency Iron-deficiency anaemia Splenectomy

HbA1c is generally thought to reflect the blood glucose over the previous '2-3 months' although there is some evidence it is weighed more strongly to glucose levels of the past 2-4 weeks

The relationship between HbA1c and average blood glucose is complex but has been studied by the Diabetes Control and Complications Trial (DCCT). A new internationally standardised method for reporting HbA1c has been developed by the International Federation of Clinical Chemistry (IFCC). This will report HbA1c in mmol per mol of haemoglobin without glucose attached.

HbA1c (%)	Average plasma glucose (mmol/l)	IFCC-HbA1c (mmol/mol)
5	5.5	

6	7.5	42
7	9.5	53
8	11.5	64
9	13.5	75
10	15.5	
11	17.5	
12	19.5	

From the above we can see that average plasma glucose = $(2 * \text{HbA1c}) - 4.5$



Question 122 of 136

Next

You are doing a medication review on a patient with chronic kidney disease who is prescribed metformin. At what creatinine value do NICE recommend stopping metformin?



- ☐ A. > 110 $\mu\text{mol/l}$
- ☐ B. > 120 $\mu\text{mol/l}$
- ☒ C. > 130 $\mu\text{mol/l}$
- ☐ D. > 140 $\mu\text{mol/l}$
- ☒ E. > 150 $\mu\text{mol/l}$

Next question

Metformin

Metformin is a biguanide used mainly in the treatment of type 2 diabetes mellitus. It has a number of actions which improves glucose tolerance (see below). Unlike sulphonylureas it does not cause hypoglycaemia and weight gain and is therefore first-line, particularly if the patient is overweight. Metformin is also used in polycystic ovarian syndrome and non-alcoholic fatty liver disease

Mechanism of action

- increases insulin sensitivity
- decreases hepatic gluconeogenesis
- may also reduce gastrointestinal absorption of carbohydrates

Adverse effects

- gastrointestinal upsets are common (nausea, anorexia, diarrhoea), intolerable in 20%
- reduced vitamin B12 absorption - rarely a clinical problem
- lactic acidosis* with severe liver disease or renal failure

Contraindications**

- chronic kidney disease: NICE recommend that the dose should be reviewed if the creatinine is $> 130 \mu\text{mol/l}$ (or $\text{eGFR} < 45 \text{ ml/min}$) and stopped if the creatinine is $> 150 \mu\text{mol/l}$ (or $\text{eGFR} < 30 \text{ ml/min}$)
- metformin may cause lactic acidosis if taken during a period where there is tissue hypoxia. Examples include a recent myocardial infarction, sepsis, acute kidney injury and severe dehydration
- iodine-containing x-ray contrast media: examples include peripheral arterial angiography, coronary angiography, intravenous pyelography (IVP); there is an increasing risk of provoking renal impairment due to contrast nephropathy; metformin should be discontinued on the day of the procedure and for 48 hours thereafter
- alcohol abuse is a relative contraindication

*it is now increasingly recognised that lactic acidosis secondary to metformin is rare, although it remains important in the context of exams

**metformin is now sometimes used in pregnancy, for example in women with polycystic ovarian syndrome

**Question 123 of 136**

Next

Which one of the following combinations of treatments should be avoided in patients with type 2 diabetes mellitus?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Metformin + insulin + exenatide |
| <input type="radio"/> | B. Sulfonylurea + DPP-4 inhibitor |
| <input type="radio"/> | C. Metformin + sulfonylurea + exenatide |
| <input type="radio"/> | D. Metformin + DPP-4 inhibitor |
| <input type="radio"/> | E. Insulin + metformin + sulfonylurea |

Next question

Exenatide should only be used in combination with metformin, a sulfonylurea or both.

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation

- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics

- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



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Next

Each one of the following is associated with hirsutism, except:



<input checked="" type="radio"/>	A. Porphyria cutanea tarda
<input type="radio"/>	B. Congenital adrenal hyperplasia
<input type="radio"/>	C. Polycystic ovarian syndrome
<input type="radio"/>	D. Adrenal tumour
<input type="radio"/>	E. Cushing's syndrome

Next question

Porphyria cutanea tarda is a cause of hypertrichosis rather than hirsutism.

Hirsutism and hypertrichosis

/hirsutism is often used to describe androgen-dependent hair growth in women, with hypertrichosis being used for androgen-independent hair growth

Polycystic ovarian syndrome is the most common causes of hirsutism. Other causes include:

- Cushing's syndrome
- congenital adrenal hyperplasia
- androgen therapy
- obesity: due to peripheral conversion oestrogens to androgens
- adrenal tumour
- androgen secreting ovarian tumour
- drugs: phenytoin

Assessment of hirsutism

- Ferriman-Gallwey scoring system: 9 body areas are assigned a score of 0 - 4, a score > 15 is considered to indicate moderate or severe hirsutism

Management of hirsutism

- advise weight loss if overweight
- cosmetic techniques such as waxing/bleaching - not available on the NHS
- consider using combined oral contraceptive pills such as co-cyprindiol (Dianette) or ethinylestradiol and drospirenone (Yasmin). Co-cyprindiol should not be used long-term due to the increased risk of venous thromboembolism
- facial hirsutism: topical eflornithine - contraindicated in pregnancy and breast-feeding

Causes of hypertrichosis

- drugs: minoxidil, ciclosporin, diazoxide
- congenital hypertrichosis lanuginosa, congenital hypertrichosis terminalis
- porphyria cutanea tarda
- anorexia nervosa



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Next

A 56-year-old Muslim man with a history of type 2 diabetes asks for advice. He is due to start fasting for Ramadan soon and is unsure what he should do with regards to his diabetes medications. He currently takes metformin 500mg tds. What is the most appropriate advice?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Switch to subcutaneous biphasic insulin for the duration of Ramadan |
| <input checked="" type="radio"/> | B. 500 mg at the predawn meal + 1000 mg at the sunset meal |
| <input type="radio"/> | C. No change to the metformin dose |

- ☐ D. 1000 mg at the predawn meal + 500 mg at the sunset meal
- ☐ E. Stop metformin for the duration of Ramadan

Next question

During Ramadan, one-third of the normal metformin dose should be taken before sunrise and two-thirds should be taken after sunset

Please see the Diabetes Care link for more details.

Diabetes mellitus: Ramadan

We know that type 2 diabetes mellitus is more common in people of Asian ethnicity and a significant proportion of those patients in the UK will be Muslim. The BMJ published an excellent and comprehensive review of this issue in 2010¹.

It is important that we can give appropriate advice to Muslim patients to allow them safely observe their fast. This is particularly important from 2014 as Ramadan is due to fall in the long days of the summer months for several years henceforth.

Clearly it is a personal decision whether a patient decides to fast. It may however be worthwhile exploring the fact that people with chronic conditions are exempt from fasting or may be able to delay fasting to the shorter days of the winter months. It is however known that many Muslim patients with diabetes do not class themselves as having a chronic/serious condition which should exempt them from fasting. Around 79% of Muslim patients with type 2 diabetes mellitus fast Ramadan². There is an excellent patient information leaflet from Diabetes UK and the Muslim Council of Britain which explores these options in more detail.

If a patient with type 2 diabetes mellitus does decide to fast:

- they should try and eat a meal containing long-acting carbohydrates prior to sunrise (Suhoor)
- patients should be given a blood glucose monitor to allow them to check their glucose levels, particularly if they feel unwell
- for patients taking metformin the expert consensus is that the dose should be split one-third before sunrise (Suhoor) and two-thirds after sunset (Iftar)

- expert consensus also recommends switching once-daily sulfonylureas to after sunset. For patients taking twice-daily preparations such as gliclazide it is recommended that a larger proportion of the dose is taken after sunset
- no adjustment is needed for patients taking pioglitazone

1. Management of people with diabetes wanting to fast during Ramadan BMJ 2010;340:c3053
 2. Salti I et al. Results of the Epidemiology of Diabetes and Ramadan (EPIDIAR) study. Diabetes Care 2004;27:2306-11.



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Next

A 72-year-old man presents for review. His medical history includes type 2 diabetes mellitus and gout. Six months ago his blood pressure was 144/84 mmHg. You gave him basic lifestyle advice and advised him to come back six months later for a repeat blood pressure check. Three further blood pressure readings have been as follows: 144/72 mmHg, 146/78 mmHg and 148/76 mmHg. His current medications include metformin and allopurinol. What is the most suitable management of his blood pressure readings?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Stop the allopurinol |
| <input type="radio"/> | B. Start therapy if 10-year cardiovascular risk is greater than 20% |
| <input type="radio"/> | C. Continue lifestyle measures and review in 6 months |
| <input type="radio"/> | D. Start bendroflumethiazide |
| <input checked="" type="radio"/> | E. Start an ACE inhibitor |



Next question

Whilst his diastolic is below the target (140 / 80 mmHg) his systolic is consistently above. Clinical Knowledge Summaries advise that primary care decision making in Type 2 diabetes should be based on the systolic value. As this man has type 2 diabetes mellitus the target blood pressure should be < 140/80 mmHg. Lifestyle measures have failed to bring his blood pressure down so he

should be offered an ACE inhibitor.

The April 2010 AKT feedback report stated: 'Items concerning routine management of type 2 diabetes caused some problem, especially with regard to the wider management of cardiovascular risks.'

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*

- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on



*many local protocols now recommend starting metformin upon diagnosis



A 45-year-old woman is investigated for being tired all the time and weight gain. She is normally fit and well and weighs 50kg. Blood tests show the following:

Free T4	7.1 pmol/l
TSH	11.2 mu/l

What is the most appropriate action?

- | | | |
|---|----------------------------------|--|
|  | <input type="radio"/> | A. Start levothyroxine 25 mcg od |
|  | <input checked="" type="radio"/> | B. Start levothyroxine 75 mcg od |
| | <input type="radio"/> | C. Start carbimazole 10mg bd |
| | <input type="radio"/> | D. Diagnose subclinical hypothyroidism and repeat thyroid function tests in 3 months |
| | <input type="radio"/> | E. Check an ESR |

Next question

This lady has symptomatic hypothyroidism and needs thyroxine replacement. The BNF guidelines suggest a starting dose for patients < 50 years of 50-100 mcg od. Studies have also shown that an initial treatment dose of 1.6mcg/kg/day is suitable for younger patients without heart disease. The answer is therefore consistent with both the BNF advice and relevant clinical trials.

Roos A, et al. The starting dose of levothyroxine in primary hypothyroidism treatment. Arch Intern Med. August 8/22, 2005;165:171420.

Hypothyroidism: management

Key points

- initial starting dose of levothyroxine should be lower in elderly patients and those with ischaemic heart disease. The BNF recommends that for patients with cardiac disease, severe hypothyroidism or patients over 50 years the initial starting dose should be 25mcg od with dose slowly titrated. Other patients should be started on a dose of 50-100mcg od
- following a change in thyroxine dose thyroid function tests should be checked after 8-12 weeks

- the therapeutic goal is 'normalisation' of the thyroid stimulating hormone (TSH) level. As the majority of unaffected people have a TSH value 0.5-2.5 mU/l it is now thought preferable to aim for a TSH in this range
- there is no evidence to support combination therapy with levothyroxine and liothyronine

Side-effects of thyroxine therapy

- hyperthyroidism: due to over treatment
- reduced bone mineral density
- worsening of angina
- atrial fibrillation

Interactions

- iron: absorption of levothyroxine reduced, give at least 2 hours apart



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Next

You are discussing the results of a fasting blood sugar with a patient. It was done after the patient was found to be hypertensive:

Glucose (fasting)	6.5 mmol/l
-------------------	------------

This patient therefore has impaired fasting glycaemia. Following recent Diabetes UK guidelines, what is the most appropriate way to communicate this result with the patient?



- | | |
|----------------------------------|-------------------------------|
| <input type="radio"/> | A. 'High sugar syndrome' |
| <input checked="" type="radio"/> | B. 'Prediabetes' |
| <input type="radio"/> | C. 'Suboptimal sugar control' |
| <input type="radio"/> | D. 'Early diabetes' |
| <input type="radio"/> | E. 'Normal' |

Please see the Diabetes UK guidelines for more details.

Prediabetes and impaired glucose regulation

Prediabetes is a term which is increasingly used where there is impaired glucose levels which are above the normal range but not high enough for a diagnosis of diabetes mellitus. The term includes patients who have been labelled as having either impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Diabetes UK estimate that around 1 in 7 adults in the UK have prediabetes. Many individuals with prediabetes will progress on to developing type 2 diabetes mellitus (T2DM) and they are therefore at greater risk of microvascular and macrovascular complications.

Terminology

- Diabetes UK currently recommend using the term prediabetes when talking to patients and impaired glucose regulation when talking to other healthcare professionals
- research has shown that the term 'prediabetes' has the most impact and is most easily understood

Identification of patients with prediabetes

- NICE recommend using a validated computer based risk assessment tool for all adults aged 40 and over, people of South Asian and Chinese descent aged 25-39, and adults with conditions that increase the risk of type 2 diabetes
- patients identified at high risk should have a blood sample taken
- a fasting plasma glucose of 5.5-6.9 mmol/l or an HbA1c level of 42-47 mmol/mol (6.0-6.4%) indicates high risk

Management

- lifestyle modification: weight loss, increased exercise, change in diet
- at least yearly follow-up with blood tests is recommended
- NICE recommend metformin for adults at high risk *'whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme'*

Impaired fasting glucose and impaired glucose tolerance

There are two main types of IGR:

- impaired fasting glucose (IFG) - due to hepatic insulin resistance
- impaired glucose tolerance (IGT) - due to muscle insulin resistance
- patients with IGT are more likely to develop T2DM and cardiovascular disease than patients with IFG

Definitions

- a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)
- impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l
- people with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT



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Next

Which one of the following increases the risk of developing peripheral oedema in a patient taking pioglitazone?



<input type="radio"/>	A. Concomitant use with gliclazide
<input type="radio"/>	B. Serum sodium < 140 mmol/l
<input checked="" type="radio"/>	C. Concomitant use with insulin
<input type="radio"/>	D. Concomitant use with metformin
<input type="radio"/>	E. Serum potassium < 4.0 mmol/l

Next question

Thiazolidinediones

Thiazolidinediones are a new class of agents used in the treatment of type 2 diabetes mellitus. They are agonists to the PPAR-gamma receptor and reduce peripheral insulin resistance. Rosiglitazone was withdrawn in 2010 following concerns about the cardiovascular side-effect profile.

The PPAR-gamma receptor is an intracellular nuclear receptor. Its natural ligands are free fatty acids and it is thought to control adipocyte differentiation and function.

Adverse effects

- weight gain
- liver impairment: monitor LFTs
- fluid retention - therefore contraindicated in heart failure. The risk of fluid retention is increased if the patient also takes insulin
- recent studies have indicated an increased risk of fractures
- bladder cancer: recent studies have showed an increased risk of bladder cancer in patients taking pioglitazone (hazard ratio 2.64)

NICE guidance on thiazolidinediones

- only continue if there is a reduction of > 0.5 percentage points in HbA1c in 6 months




Question 130 of 136

Next

A 56-year-old man with a history of hypertension presents for review. As part of his annual health check he has a U&E, HbA1c and cholesterol check done. The following results are obtained:

His blood pressure today is 128/78 mmHg. His only regular medication is ramipril 5mg od.

Na ⁺	142 mmol/l
K ⁺	4.6 mmol/l
Urea	5.2 mmol/l
Creatinine	88  mol/l
Total cholesterol	5.2 mmol/l
HbA1c	45 mmol/mol (6.3%)

His 10-year QRISK2 score is 7%. What is the most appropriate action following these results?

- | | |
|----------------------------------|--------------------------------------|
| <input type="radio"/> | A. Start atorvastatin 20mg on |
| <input checked="" type="radio"/> | B. Arrange a fasting glucose sample |
| <input checked="" type="radio"/> | C. Diagnose type 2 diabetes mellitus |
| <input type="radio"/> | D. Increase the dose of ramipril |
| <input type="radio"/> | E. Add amlodipine 5mg od |

Next question

His QRISK2 score is < 10% so no action needs taking about his cholesterol. His blood pressure is also well controlled.

His HbA1c is on the higher side and currently resides in the pre-diabetes range (42-47 mmol/mol). A HbA1c reading cannot however be used to exclude diabetes - a fasting sample should therefore be arranged.

Diabetes mellitus (type 2): diagnosis

The diagnosis of type 2 diabetes mellitus can only be made by either a plasma glucose or HbA1c sample. Diagnostic criteria vary according to whether the patient is symptomatic (polyuria, polydipsia etc) or not.

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus

- a HbA1c value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (see below)

Conditions where HbA1c may not be used for diagnosis:

- haemoglobinopathies
- haemolytic anaemia
- untreated iron deficiency anaemia
- suspected gestational diabetes
- children
- HIV
- chronic kidney disease

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'




Question 131 of 136

Next

A 58-year-old man with a history of morbid obesity and hypertension is reviewed in clinic. A recent fasting glucose was reported as 6.3 mmol/l. A HbA1c is therefore requested to further investigate his

glucose regulation. What is the lowest IFCC-HbA1c (not DCCT-HbA1c) value that would indicate a diagnosis of prediabetes?

[Next question](#)

You answered: **6.5** mmol/mol 

Correct answer: **42** mmol/mol

Prediabetes and impaired glucose regulation

Prediabetes is a term which is increasingly used where there is impaired glucose levels which are above the normal range but not high enough for a diagnosis of diabetes mellitus. The term includes patients who have been labelled as having either impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Diabetes UK estimate that around 1 in 7 adults in the UK have prediabetes. Many individuals with prediabetes will progress on to developing type 2 diabetes mellitus (T2DM) and they are therefore at greater risk of microvascular and macrovascular complications.

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- patients identified at high risk should have a blood sample taken
- a fasting plasma glucose of 5.5-6.9 mmol/l or an HbA1c level of 42-47 mmol/mol (6.0-6.4%) indicates high risk

Management

- lifestyle modification: weight loss, increased exercise, change in diet
- at least yearly follow-up with blood tests is recommended

- NICE recommend metformin for adults at high risk '*whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme*'

Impaired fasting glucose and impaired glucose tolerance

There are two main types of IGR:

- impaired fasting glucose (IFG) - due to hepatic insulin resistance
- impaired glucose tolerance (IGT) - due to muscle insulin resistance
- patients with IGT are more likely to develop T2DM and cardiovascular disease than patients with IFG

Definitions

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- people with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT



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Next

A 49-year-old man with type 2 diabetes mellitus is reviewed. Despite weight loss and therapy with metformin and gliclazide his last HbA1c is 7.2%. Which one of the following factors would suggest that the patient may benefit from a meglitinide?



- | | |
|-----------------------|--|
| <input type="radio"/> | A. Obesity |
| <input type="radio"/> | B. Not adhering to diabetic diet |
| <input type="radio"/> | C. Problems with hypoglycaemia from gliclazide |



D. Erratic lifestyle



E. Elderly and frail patients

Next question

Meglitinides - stimulate insulin release - good for erratic lifestyle

Meglitinides stimulate insulin release and are particularly useful for post-prandial hyperglycaemia or an erratic eating schedule, as patients take them shortly before meals

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



Question 133 of 136

Next

Which one of the following drugs is least likely to cause gynaecomastia?



A. Spironolactone



B. Sodium valproate



C. Digoxin



D. Cimetidine



E. Anabolic steroids

Next question

Whilst sodium valproate may rarely causes gynaecomastia it is much more common after taking the other listed drugs.

Gynaecomastia

Gynaecomastia describes an abnormal amount of breast tissue in males and is usually caused by an increased oestrogen:androgen ratio. It is important to differentiate the causes of galactorrhoea (due to the actions of prolactin on breast tissue) from those of gynaecomastia

Causes of gynaecomastia

- physiological: normal in puberty
- syndromes with androgen deficiency: Kallman's, Klinefelter's
- testicular failure: e.g. mumps
- liver disease
- testicular cancer e.g. seminoma secreting hCG
- ectopic tumour secretion
- hyperthyroidism
- haemodialysis
- drugs: see below

Drug causes of gynaecomastia

- spironolactone (most common drug cause)

- cimetidine
- digoxin
- cannabis
- finasteride
- gonadorelin analogues e.g. Goserelin, buserelin
- oestrogens, anabolic steroids

Very rare drug causes of gynaecomastia

- tricyclics
- isoniazid
- calcium channel blockers
- heroin
- busulfan
- methyl dopa



Question 134 of 136

Next

Which one of the following statements regarding dipeptidyl peptidase-4 inhibitors in the management of type 2 diabetes mellitus is correct?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Metformin should always be co-prescribed |
| <input checked="" type="radio"/> | B. Do not cause weight gain |
| <input type="radio"/> | C. Is given via a subcutaneous injection |
| <input type="radio"/> | D. An example is exenatide |
| <input type="radio"/> | E. Patients should be warned that hypoglycaemia is the most common side-effect |

Next question

Hypoglycaemia is rare in patients taking dipeptidyl peptidase-4 inhibitors.

Diabetes mellitus: GLP-1 and the new drugs

A number of new drugs to treat diabetes mellitus have become available in recent years. Much research has focused around the role of glucagon-like peptide-1 (GLP-1), a hormone released by the small intestine in response to an oral glucose load

Whilst it is well known that insulin resistance and insufficient B-cell compensation occur other effects are also seen in type 2 diabetes mellitus (T2DM). In normal physiology an oral glucose load results in a greater release of insulin than if the same load is given intravenously - this known as the incretin effect. This effect is largely mediated by GLP-1 and is known to be decreased in T2DM.

Increasing GLP-1 levels, either by the administration of an analogue (glucagon-like peptide-1, GLP-1 mimetics, e.g. exenatide) or inhibiting its breakdown (dipeptidyl peptidase-4 ,DPP-4 inhibitors - the gliptins), is therefore the target of two recent classes of drug.

Glucagon-like peptide-1 (GLP-1) mimetics (e.g. exenatide)

Exenatide is an example of a glucagon-like peptide-1 (GLP-1) mimetic. These drugs increase insulin secretion and inhibit glucagon secretion. One of the major advances of GLP-1 mimetics is that they typically result in weight loss, in contrast to many medications such as insulin, sulfonylureas and thiazolidinediones.

Exenatide must be given by subcutaneous injection within 60 minutes before the morning and evening meals. It should not be given after a meal.

Liraglutide is the other GLP-1 mimetic currently available. One the main advantages of liraglutide over exenatide is that it only needs to be given once a day.

Both exenatide and liraglutide may be combined with metformin and a sulfonylurea. Standard release exenatide is also licensed to be used with basal insulin alone or with metformin. Please see the BNF for a more complete list of licensed indications.

NICE state the following:

Consider adding exenatide to metformin and a sulfonylurea if:

- *BMI \geq 35 kg/m² in people of European descent and there are problems associated with high weight, or*
- *BMI $<$ 35 kg/m² and insulin is unacceptable because of occupational implications or weight loss would benefit other comorbidities.*

NICE like patients to have achieved a 1% reduction in HbA1c and 3% weight loss after 6 months to justify the ongoing prescription of GLP-1 mimetics.

The major adverse effect of GLP-1 mimetics is nausea and vomiting. The Medicines and Healthcare products Regulatory Agency has issued specific warnings on the use of exenatide, reporting that is has been linked to severe pancreatitis in some patients.

Dipeptidyl peptidase-4 (DPP-4) inhibitors (e.g. Vildagliptin, sitagliptin)

Key points

- oral preparation
- trials to date show that the drugs are relatively well tolerated with no increased incidence of hypoglycaemia
- do not cause weight gain

NICE guidelines on DPP-4 inhibitors

- continue DPP-4 inhibitor only if there is a reduction of > 0.5 percentage points in HbA1c in 6 months
- NICE suggest that a DPP-4 inhibitor might be preferable to a thiazolidinedione if further weight gain would cause significant problems, a thiazolidinedione is contraindicated or the person has had a poor response to a thiazolidinedione



Question 135 of 136

Next

A middle-aged man with type 2 diabetes mellitus is reviewed. Despite weight loss, metformin and gliclazide his HbA1c is 8.4%. The patient agrees to start insulin therapy. According to NICE guidelines which type of insulin should be tried initially?

- | | |
|----------------------------------|-----------------------|
| <input type="radio"/> | A. Basal bolus regime |
| <input checked="" type="radio"/> | B. Isophane |

<input type="radio"/>	C. Biphasic insulin
<input checked="" type="radio"/>	D. Glargine
<input type="radio"/>	E. Detemir

Next question

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 48 mmol/mol (DCCT = 6.5%). HbA1c levels below 48 mmol/mol (DCCT = 6.5%) should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new

therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 48 mmol/mol (DCCT = 6.5%)
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 58 mmol/mol (DCCT = 7.5%) then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m²) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 58 mmol/mol (DCCT = 7.5%)
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- following the 2014 NICE lipid modification guidelines only patients with a 10-year cardiovascular risk > 10% (using QRISK2) should be offered a statin. The first-line statin of choice is atorvastatin 20mg on

*many local protocols now recommend starting metformin upon diagnosis



A 58-year-old man comes for review in the diabetes clinic. He was diagnosed as having type 2 diabetes mellitus (T2DM) around 10 years ago and currently only takes gliclazide and simvastatin. Three years ago he was successfully treated for bladder cancer. A recent trial of metformin was unsuccessful due to gastrointestinal side-effects. He works as an accountant, is a non-smoker and his BMI is 31 kg/m². His annual bloods show the following:

Na ⁺	138 mmol/l
K ⁺	4.1 mmol/l
Urea	4.3 mmol/l
Creatinine	104 μ mol/l
HbA1c	7.8%

What is the most appropriate next step in management?

-  ☐ A. Add pioglitazone
- ☐ B. Add exenatide
- ☐ C. Add acarbose
- ☐ D. Add repaglinide
-  ☒ E. Add sitagliptin

If we review the NICE T2DM guidelines we can see that this patient is on the 'right hand side' of the algorithm. Pioglitazone is contraindicated by his history of bladder cancer and may contribute to his obesity. A DPP-4 inhibitor such as sitagliptin is therefore the best option.

Exenatide generally causes weight loss and is therefore useful in obese diabetics but he does not meet the NICE body mass index criteria of 35 kg/m².

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Question 1 of 117

Next

A 28-year-old woman is diagnosed with constipation predominant irritable bowel syndrome. She occasionally experiences spasms of pain in the left iliac fossa.

Which one of the following is LEAST likely to help her symptoms?

- | | |
|----------------------------------|--------------------|
| <input type="radio"/> | A. Mebeverine |
| <input checked="" type="radio"/> | B. Ispaghula |
| <input type="radio"/> | C. Methylcellulose |
| <input type="radio"/> | D. Sterculia |
| <input checked="" type="radio"/> | E. Lactulose |

Next question

NICE recommend avoiding lactulose in the management of IBS

Irritable bowel syndrome: management

The management of irritable bowel syndrome (IBS) is often difficult and varies considerably between patients. NICE issued guidelines in 2008

First-line pharmacological treatment - according to predominant symptom

- pain: antispasmodic agents
- constipation: laxatives but avoid lactulose
- diarrhoea: loperamide is first-line

Second-line pharmacological treatment

- low-dose tricyclic antidepressants (e.g. amitriptyline 5-10 mg) are used in preference to selective serotonin reuptake inhibitors

Other management options

- psychological interventions - if symptoms do not respond to pharmacological treatments after 12 months and who develop a continuing symptom profile (refractory IBS), consider referring for cognitive behavioural therapy, hypnotherapy or psychological therapy
- complementary and alternative medicines: 'do not encourage use of acupuncture or reflexology for the treatment of IBS'

General dietary advice

- have regular meals and take time to eat
- avoid missing meals or leaving long gaps between eating
- drink at least 8 cups of fluid per day, especially water or other non-caffeinated drinks such as herbal teas
- restrict tea and coffee to 3 cups per day
- reduce intake of alcohol and fizzy drinks
- consider limiting intake of high-fibre food (for example, wholemeal or high-fibre flour and breads, cereals high in bran, and whole grains such as brown rice)
- reduce intake of 'resistant starch' often found in processed foods
- limit fresh fruit to 3 portions per day
- for diarrhoea, avoid sorbitol
- for wind and bloating consider increasing intake of oats (for example, oat-based

breakfast cereal or porridge) and linseeds (up to one tablespoon per day).



Question 2 of 117

Next

You are asked to review a 78-year-old woman with a non-healing leg ulcer by the practice nurse. You notice she is very thin. What is the most appropriate tool to screen for malnutrition?



<input type="radio"/>	A. GPMS
<input type="radio"/>	B. MN-10
<input checked="" type="radio"/>	C. MUST

<input type="radio"/>	D. GP-MN
<input type="radio"/>	E. MSPC

Next question

Malnutrition

Malnutrition is an important consequence of and contributor to chronic disease. It is clearly a complex and multifactorial problem that can be difficult to manage but there are a number of key points to remember for the exam.

NICE define malnutrition as the following:

- a Body Mass Index (BMI) of less than 18.5; or
- unintentional weight loss greater than 10% within the last 3-6 months; or
- a BMI of less than 20 and unintentional weight loss greater than 5% within the last 3-6 months

Around 10% of patients aged over 65 years are malnourished, the vast majority of those living independently, i.e. not in hospital or care/nursing homes.

Screening for malnutrition is mostly done using MUST (Malnutrition Universal Screen Tool). A link is provided to a copy of the MUST score algorithm.

- it should be done on admission to care/nursing homes and hospital, or if there is concern.
For example an elderly, thin patient with pressure sores
- it takes into account BMI, recent weight change and the presence of acute disease
- categorises patients into low, medium and high risk

Management of malnutrition is difficult. NICE recommend the following points:

- dietician support if the patient is high-risk
- a 'food-first' approach with clear instructions (e.g. 'add full-fat cream to mashed potato'), rather than just prescribing oral nutritional supplements (ONS) such as Ensure
- if ONS are used they should be taken between meals, rather than instead of meals



Question 3 of 117

Next

A 35-year-old man who is usually fit and well presents to his GP with a 2 month history of indigestion. His weight is stable and there is no history of dysphagia. Examination of the abdomen is unremarkable. Of the following options, what is the most suitable initial management?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Urea breath testing and non-urgent referral for endoscopy |
| <input type="radio"/> | B. H pylori eradication therapy and full-dose proton pump inhibitor for three months |
| <input type="radio"/> | C. Full-dose Proton pump inhibitor and immediate referral for endoscopy |
| <input type="radio"/> | D. Three month course of a standard-dose proton pump inhibitor |
| <input checked="" type="radio"/> | E. One month course of a full-dose proton pump inhibitor |

Next question

This question highlights the NICE guidelines for the management of dyspepsia.

There is no evidence currently to suggest whether a one month course of a PPI or 'test and treat' strategy should be adopted first line. Many clinicians prefer to test for H pylori first as this cannot be done within 2 weeks of acid-suppression therapy, as false-negative results may occur

Given the options available, only the answer is in line with current NICE guidelines

Dyspepsia

In 2014 NICE updated their guidelines for the management of dyspepsia. These take into account the age of the patient (whether younger or older than 55 years) and the presence or absence of 'alarm signs':

- chronic gastrointestinal bleeding
- progressive unintentional weight loss
- progressive difficulty swallowing
- persistent vomiting
- iron deficiency anaemia
- epigastric mass
- suspicious barium meal

Deciding whether urgent referral for endoscopy is needed

Urgent referral (within 2 weeks) is indicated for patients with any alarm signs irrespective of age

Routine endoscopic investigation of patients of any age, presenting with dyspepsia and without alarm signs is not necessary, however

Patients aged 55 years and over should be referred urgently for endoscopy if dyspepsia symptoms are:

- recent in onset rather than recurrent and
- unexplained (e.g. New symptoms which cannot be explained by precipitants such as NSAIDs) and
- persistent: continuing beyond a period that would normally be associated with self-limiting problems (e.g. Up to four to six weeks, depending on the severity of signs and symptoms)

Managing patients who do not meet referral criteria ('undiagnosed dyspepsia')

This can be summarised at a step-wise approach

- 1. Review medications for possible causes of dyspepsia
- 2. Lifestyle advice
- 3. Trial of full-dose PPI for one month*
- 4. 'Test and treat' using carbon-13 urea breath test

*it is unclear from studies whether a trial of a PPI or a 'test and treat' should be used first

1 / 3 Question 4-6 of 117

Next

Theme: Hepatobiliary disease and related disorders

A. Ascending cholangitis

B. Duodenal ulcer

C. Biliary colic

D.	Amoebic liver abscess
E.	Pancreatic cancer
F.	Viral hepatitis
G.	Congestive hepatomegaly
H.	Cholangiocarcinoma
I.	Gallstone ileus
J.	Acute pancreatitis

For each of the following scenarios please select the most likely diagnosis:

4. A 57-year-old woman with a history of gallstones presents with progressive right upper quadrant pain, rigors and jaundice.

✓ Ascending cholangitis

This is a classical presentation of ascending cholangitis.

5. A 62-year-old presents with upper abdominal pain. She has recently been discharged from hospital where she underwent an ERCP to investigate cholestatic liver function tests. The pain is severe. On examination she is afebrile and has a pulse of 96 / min.

✗ You answered Ascending cholangitis

The correct answer is Acute pancreatitis

Pancreatitis may develop following an ERCP.

6. A 76-year-old woman presents with abdominal pain, distension and vomiting. She recently had an episode of acute cholecystitis and is awaiting a cholecystectomy. She feels her symptoms have returned over the past few days. On examination her abdomen is distended.

✗ You answered Ascending cholangitis

The correct answer is Gallstone ileus

This patient has developed small bowel obstruction secondary to an impacted gallstone.

Next question

Hepatobiliary disease and related disorders

The table below gives characteristic exam question features for conditions causing hepatobiliary disease and related disorders:

Viral hepatitis	<p>Common symptoms include:</p> <ul style="list-style-type: none">• nausea and vomiting, anorexia• myalgia• lethargy• right upper quadrant (RUQ) pain <p>Questions may point to risk factors such as foreign travel or intravenous drug use.</p>
Congestive hepatomegaly	<p>The liver only usually causes pain if stretched. One common way this can occur is as a consequence of congestive heart failure. In severe cases cirrhosis may occur.</p>
Biliary colic	<p>RUQ pain, intermittent, usually begins abruptly and subsides gradually. Attacks often occur after eating. Nausea is common.</p> <p>It is sometimes taught that patients are female, forties, fat and fair although this is obviously a generalisation.</p>
Acute cholecystitis	<p>Pain similar to biliary colic but more severe and persistent. The pain may radiate to the back or right shoulder.</p> <p>The patient may be pyrexial and Murphy's sign positive (arrest of inspiration on palpation of the RUQ)</p>
Ascending cholangitis	<p>An infection of the bile ducts commonly secondary to gallstones. Classically presents with a triad of:</p> <ul style="list-style-type: none">• fever (rigors are common)• RUQ pain• jaundice
Gallstone ileus	<p>This describes small bowel obstruction secondary to an impacted gallstone. It may develop if a fistula forms between a gangrenous gallbladder and the duodenum.</p> <p>Abdominal pain, distension and vomiting are seen.</p>

Cholangiocarcinoma	Persistent biliary colic symptoms, associated with anorexia, jaundice and weight loss. A palpable mass in the right upper quadrant (Courvoisier sign), periumbilical lymphadenopathy (Sister Mary Joseph nodes) and left supraclavicular adenopathy (Virchow node) may be seen
Acute pancreatitis	Usually due to alcohol or gallstones Severe epigastric pain Vomiting is common Examination may reveal tenderness, ileus and low-grade fever Periumbilical discolouration (Cullen's sign) and flank discolouration (Grey-Turner's sign) is described but rare
Pancreatic cancer	Painless jaundice is the classical presentation of pancreatic cancer. However pain is actually a relatively common presenting symptom of pancreatic cancer. Anorexia and weight loss are common
Amoebic liver abscess	Typical symptoms are malaise, anorexia and weight loss. The associated RUQ pain tends to be mild and jaundice is uncommon.



Question 7 of 117

Next

Which one of the following features is more common in Crohn's disease than ulcerative colitis?



- ☒ A. Abdominal mass palpable in the right iliac fossa
- ☐ B. Tenesmus
- ☐ C. Bloody diarrhoea
- ☐ D. Faecal incontinence
- ☐ E. Abdominal pain in the left lower quadrant

Next question

Inflammatory bowel disease: key differences

The two main types of inflammatory bowel disease are Crohn's disease and Ulcerative colitis. They have many similarities in terms of presenting symptoms, investigation findings and management options. There are however some key differences which are highlighted in table below:

	Crohn's disease (CD)	Ulcerative colitis (UC)
Features	Diarrhoea usually non-bloody Weight loss more prominent Upper gastrointestinal symptoms, mouth ulcers, perianal disease Abdominal mass palpable in the right iliac fossa	Bloody diarrhoea more common Abdominal pain in the left lower quadrant Tenesmus
Extra-intestinal	Gallstones are more common secondary to reduced bile acid reabsorption Oxalate renal stones*	Primary sclerosing cholangitis more common
Complications	Obstruction, fistula, colorectal cancer	Risk of colorectal cancer high in UC than CD
Pathology	Lesions may be seen anywhere from the mouth to anus Skip lesions may be present	Inflammation always starts at rectum and never spreads beyond ileocaecal valve Continuous disease
Histology	Inflammation in all layers from mucosa to serosa <ul style="list-style-type: none"> • increased goblet cells • granulomas 	No inflammation beyond submucosa (unless fulminant disease) - inflammatory cell infiltrate in lamina propria <ul style="list-style-type: none"> • neutrophils migrate through the walls of glands to form crypt abscesses • depletion of goblet cells and mucin from gland epithelium • granulomas are infrequent
Endoscopy	Deep ulcers, skip lesions - 'cobble-stone' appearance	Widespread ulceration with preservation of adjacent mucosa which has the appearance of polyps ('pseudopolyps')
Radiology	Small bowel enema	Barium enema

	<ul style="list-style-type: none"> • high sensitivity and specificity for examination of the terminal ileum • strictures: 'Kantor's string sign' • proximal bowel dilation • 'rose thorn' ulcers • fistulae 	<ul style="list-style-type: none"> • loss of haustrations • superficial ulceration, 'pseudopolyps' • long standing disease: colon is narrow and short - 'drainpipe colon'
--	--	--

*impaired bile acid reabsorption increases the loss calcium in the bile. Calcium normally binds oxalate.



Question 8 of 117

Next

A 30-year-old woman is admitted to hospital with abdominal pain and diarrhoea. She has no past medical history other than depression for which she takes citalopram. She smokes 20 cigarettes/day and drinks 20 units of alcohol per week. Ileocolonoscopy shows features consistent with Crohn's disease and she is treated successfully with glucocorticoid therapy. Which one of the following is the most important intervention to reduce the chance of further episodes?

- ☐ A. Infliximab
- ☐ B. Stop drinking
- ☒ C. Stop smoking
- ☐ D. Mesalazine
- ☐ E. Budesonide

Next question

Crohn's disease: management

Crohn's disease is a form of inflammatory bowel disease. It commonly affects the terminal ileum and

colon but may be seen anywhere from the mouth to anus. NICE published guidelines on the management of Crohn's disease in 2012.

General points

- patients should be strongly advised to stop smoking
- some studies suggest an increased risk of relapse secondary to NSAIDs and the combined oral contraceptive pill but the evidence is patchy

Inducing remission

- glucocorticoids (oral, topical or intravenous) are generally used to induce remission. Budesonide is an alternative in a subgroup of patients
- enteral feeding with an elemental diet may be used in addition to or instead of other measures to induce remission, particularly if there is concern regarding the side-effects of steroids (for example in young children)
- 5-ASA drugs (e.g. mesalazine) are used second-line to glucocorticoids but are not as effective
- azathioprine or mercaptopurine* may be used as an add-on medication to induce remission but is not used as monotherapy. Methotrexate is an alternative to azathioprine
- infliximab is useful in refractory disease and fistulating Crohn's. Patients typically continue on azathioprine or methotrexate
- metronidazole is often used for isolated peri-anal disease

Maintaining remission

- as above, stopping smoking is a priority (remember: smoking makes Crohn's worse, but may help ulcerative colitis)
- azathioprine or mercaptopurine is used first-line to maintain remission
- methotrexate is used second-line
- 5-ASA drugs (e.g. mesalazine) should be considered if a patient has had previous surgery

Surgery

- around 80% of patients with Crohn's disease will eventually have surgery

*assess thiopurine methyltransferase (TPMT) activity before offering azathioprine or mercaptopurine



Question 9 of 117

Next

Which one of the following is the most effective screening tool for harmful alcohol drinking and alcohol dependence?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Liver ultrasound |
| <input type="radio"/> | B. CAGE questionnaire |
| <input type="radio"/> | C. FAST questionnaire |
| <input type="radio"/> | D. Combination of MCV and gamma GT blood test |
| <input checked="" type="radio"/> | E. AUDIT questionnaire |

Next question

Alcohol - problem drinking: detection and assessment

Screening

AUDIT

- 10 item questionnaire, please see the link
- takes about 2-3 minutes to complete
- has been shown to be superior to CAGE and biochemical markers for predicting alcohol problems
- minimum score = 0, maximum score = 40
- a score of 8 or more in men, and 7 or more in women, indicates a strong likelihood of hazardous or harmful alcohol consumption
- a score of 15 or more in men, and 13 or more in women, is likely to indicate alcohol dependence
- AUDIT-C is an abbreviated form consisting of 3 questions

FAST

- 4 item questionnaire

- minimum score = 0, maximum score = 16
- the score for hazardous drinking is 3 or more
- with relation to the first question 1 drink = 1/2 pint of beer or 1 glass of wine or 1 single spirits
- if the answer to the first question is 'never' then the patient is not misusing alcohol
- if the response to the first question is 'Weekly' or 'Daily or almost daily' then the patient is a hazardous, harmful or dependent drinker. Over 50% of people will be classified using just this one question

1	MEN: How often do you have EIGHT or more drinks on one occasion? WOMEN: How often do you have SIX or more drinks on one occasion?
2	How often during the last year have you been unable to remember what happened the night before because you had been drinking?
3	How often during the last year have you failed to do what was normally expected of you because of drinking?
4	In the last year has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?

CAGE

- well known but recent research has questioned its value as a screening test
- two or more positive answers is generally considered a 'positive' result

C	Have you ever felt you should Cut down on your drinking?
A	Have people Annoyed you by criticising your drinking?
G	Have you ever felt bad or Guilty about your drinking?
E	Have you ever had a drink in the morning to get rid of a hangover (E ye opener)?

Diagnosis

ICD-10 definition - 3 or more needed

- compulsion to drink

- difficulties controlling alcohol consumption
- physiological withdrawal
- tolerance to alcohol
- neglect of alternative activities to drinking
- persistent use of alcohol despite evidence of harm



Question 10 of 117

Next

A 35-year-old female presents with abdominal pain associated with bloating for the past 6 months, Which one of the following symptoms is least associated with a diagnosis of irritable bowel syndrome?



<input type="radio"/>	A. Feeling of incomplete stool evacuation
<input checked="" type="radio"/>	B. Weight loss
<input type="radio"/>	C. Back pain
<input type="radio"/>	D. Lethargy
<input type="radio"/>	E. Nausea

Next question

Weight loss is not a feature of IBS and underlying malignancy or inflammatory bowel disease needs to be excluded

Irritable bowel syndrome: diagnosis

NICE published clinical guidelines on the diagnosis and management of irritable bowel syndrome (IBS) in 2008

The diagnosis of IBS should be considered if the patient has had the following for at least 6 months:

- abdominal pain, and/or
- bloating, and/or
- change in bowel habit

A positive diagnosis of IBS should be made if the patient has abdominal pain relieved by defecation or associated with altered bowel frequency stool form, in addition to 2 of the following 4 symptoms:

- altered stool passage (straining, urgency, incomplete evacuation)
- abdominal bloating (more common in women than men), distension, tension or hardness
- symptoms made worse by eating
- passage of mucus

Features such as lethargy, nausea, backache and bladder symptoms may also support the diagnosis

Red flag features should be enquired about:

- rectal bleeding
- unexplained/unintentional weight loss
- family history of bowel or ovarian cancer
- onset after 60 years of age

Suggested primary care investigations are:

- full blood count
- ESR/CRP
- coeliac disease screen (tissue transglutaminase antibodies)



Question 11 of 117

Next

A 54-year-old woman presents with jaundice shortly after being discharged from hospital. Liver function tests are reported as follows:

Albumin	49 g/l
Bilirubin	89 μ mol/l
Alanine transferase (ALT)	66 iu/l
Alkaline phosphatase (ALP)	245 μ mol/l

Gamma glutamyl transferase (γGT)	529 u/l
----------------------------------	---------

Which of the following antibiotics is she most likely to have received?



☒ A. Co-amoxiclav

☐ B. Gentamicin

☐ C. Ciprofloxacin

☐ D. Trimethoprim

☐ E. Ceftazidime

[Next question](#)

Co-amoxiclav is a well recognised cause of cholestasis

Drug-induced liver disease

Drug-induced liver disease is generally divided into hepatocellular, cholestatic or mixed. There is however considerable overlap, with some drugs causing a range of changes to the liver

The following drugs tend to cause a hepatocellular picture:

- paracetamol
- sodium valproate, phenytoin
- MAOIs
- halothane
- anti-tuberculosis: isoniazid, rifampicin, pyrazinamide
- statins
- alcohol
- amiodarone
- methyldopa
- nitrofurantoin

The following drugs tend to cause cholestasis (+/- hepatitis):

- oral contraceptive pill
- antibiotics: flucloxacillin, co-amoxiclav, erythromycin*
- anabolic steroids, testosterone
- phenothiazines: chlorpromazine, prochlorperazine
- sulphonylureas
- fibrates
- rare reported causes: nifedipine

Liver cirrhosis

- methotrexate
- methyl dopa
- amiodarone

*risk may be reduced with erythromycin stearate



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Next

A 22-year-old man presents with a three week history of diarrhoea. He says his bowels have not been right for the past few months and he frequently has to run to the toilet. These symptoms had seemed to be improving up until three weeks ago. For the past week he has also been passing some blood in the stool and reports the feeling of incomplete evacuation after going. He has lost no weight and has a good appetite. Examination of his abdomen demonstrates mild tenderness in the left lower quadrant but no guarding. What is the most likely diagnosis?



<input type="radio"/>	A. Diverticulitis
<input type="radio"/>	B. Colorectal cancer
<input type="radio"/>	C. Crohn's disease
<input checked="" type="radio"/>	D. Ulcerative colitis
<input type="radio"/>	E. Infective diarrhoea

Next question

Ulcerative colitis

Ulcerative colitis (UC) is a form of inflammatory bowel disease. Inflammation always starts at rectum (hence it is the most common site for UC), never spreads beyond ileocaecal valve and is continuous. The peak incidence of ulcerative colitis is in people aged 15-25 years and in those aged 55-65 years.

The initial presentation is usually following insidious and intermittent symptoms. Features include:

- bloody diarrhoea
- urgency
- tenesmus
- abdominal pain, particularly in the left lower quadrant
- extra-intestinal features (see below)

Questions regarding the 'extra-intestinal' features of inflammatory bowel disease are common:

	Common to both Crohn's disease (CD) and Ulcerative colitis (UC)	Notes
Related to disease activity	Arthritis: pauciarticular, asymmetric Erythema nodosum Episcleritis Osteoporosis	Arthritis is the most common extra-intestinal feature in both CD and UC Episcleritis is more common in CD
Unrelated to disease activity	Arthritis: polyarticular, symmetric Uveitis Pyoderma gangrenosum Clubbing Primary sclerosing cholangitis	Primary sclerosing cholangitis is much more common in UC Uveitis is more common in UC

Pathology

- red, raw mucosa, bleeds easily
- no inflammation beyond submucosa (unless fulminant disease)
- widespread ulceration with preservation of adjacent mucosa which has the appearance of polyps ('pseudopolyps')
- inflammatory cell infiltrate in lamina propria

- neutrophils migrate through the walls of glands to form crypt abscesses
- depletion of goblet cells and mucin from gland epithelium
- granulomas are infrequent

Barium enema

- loss of haustrations
- superficial ulceration, 'pseudopolyps'
- long standing disease: colon is narrow and short -'drainpipe colon'



Question 13 of 117

Next

A 78-year-old woman develops profuse, offensive watery diarrhoea following a course of co-amoxiclav. A diagnosis of *Clostridium difficile* diarrhoea is made. On examination she is haemodynamically stable, afebrile and has no abdominal signs. What is the most appropriate first-line therapy?



<input type="radio"/>	A. Oral vancomycin for 7 days
<input checked="" type="radio"/>	B. Oral metronidazole for 10-14 days
<input type="radio"/>	C. Oral metronidazole + vancomycin for 10-14 days
<input type="radio"/>	D. Oral metronidazole for 7 days
<input type="radio"/>	E. Probiotic yoghurt for 14 days

Next question

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an

exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea
- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



Question 14 of 117

Next

A 42-year-old woman is investigated for lethargy and diarrhoea. Investigations reveal positive anti-endomysial antibodies. Each of the following food stuffs should be avoided, except:

<input type="radio"/>	A. Beer
<input checked="" type="radio"/>	B. Rye
<input checked="" type="radio"/>	C. Maize
<input type="radio"/>	D. Bread



E. Pasta

Next question

Coeliac disease: management

The management of coeliac disease involves a gluten-free diet. Gluten containing cereals include:

- wheat: bread, pasta, pastry
- barley*: beer
- rye
- oats**

Some notable foods which are gluten-free include:

- rice
- potatoes
- corn (maize)

Tissue transglutaminase antibodies may be checked to check compliance with a gluten free diet.

*whisky is made using malted barley. Proteins such as gluten are however removed during the distillation process making it safe to drink for patients with coeliac disease

**some patients with coeliac disease appear able to tolerate oats



Question 15 of 117

Next

A 31-year-old woman who initially presented with abdominal pain and constipation is diagnosed with irritable bowel syndrome. Which one of the following bits of dietary advice is it least suitable to give?



A. Avoid missing meals



B. Restrict tea and coffee to 3 cups per day



C. Increase the intake of fibre such as bran and wholemeal bread



D. Reduce intake of alcohol



E. Drink at least 8 cups of fluid per day

Next question

Insoluble sources of fibre such as bran and wholemeal should be avoided in IBS

Irritable bowel syndrome: management

The management of irritable bowel syndrome (IBS) is often difficult and varies considerably between patients. NICE issued guidelines in 2008

First-line pharmacological treatment - according to predominant symptom

- pain: antispasmodic agents
- constipation: laxatives but avoid lactulose
- diarrhoea: loperamide is first-line

Second-line pharmacological treatment

- low-dose tricyclic antidepressants (e.g. amitriptyline 5-10 mg) are used in preference to selective serotonin reuptake inhibitors

Other management options

- psychological interventions - if symptoms do not respond to pharmacological treatments after 12 months and who develop a continuing symptom profile (refractory IBS), consider referring for cognitive behavioural therapy, hypnotherapy or psychological therapy
- complementary and alternative medicines: 'do not encourage use of acupuncture or reflexology for the treatment of IBS'

General dietary advice

- have regular meals and take time to eat
- avoid missing meals or leaving long gaps between eating
- drink at least 8 cups of fluid per day, especially water or other non-caffeinated drinks such as herbal teas
- restrict tea and coffee to 3 cups per day
- reduce intake of alcohol and fizzy drinks
- consider limiting intake of high-fibre food (for example, wholemeal or high-fibre flour and breads, cereals high in bran, and whole grains such as brown rice)
- reduce intake of 'resistant starch' often found in processed foods
- limit fresh fruit to 3 portions per day
- for diarrhoea, avoid sorbitol
- for wind and bloating consider increasing intake of oats (for example, oat-based

breakfast cereal or porridge) and linseeds (up to one tablespoon per day).



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Next

A 65-year-old man with liver cirrhosis of unknown cause is reviewed in clinic. Which one of the following factors is most likely to indicate a poor prognosis?



<input type="radio"/>	A. Alanine transaminase > 200 u/l
<input type="radio"/>	B. Caput medusae
<input checked="" type="radio"/>	C. Ascites
<input type="radio"/>	D. Gynecomastia
<input type="radio"/>	E. Splenomegaly

Next question

Child-Pugh classification of liver cirrhosis

The Child-Pugh classification is a scoring system to assess the severity of liver cirrhosis

Score	1	2	3
Bilirubin (♦mol/l)	<34	34-50	>50
Albumin (g/l)	>35	28-35	<28
Prothrombin time, prolonged by (s)	<4	4-6	>6
Encephalopathy	none	mild	marked
Ascites	none	mild	marked

Summation of the scores allows the severity to be graded either A, B or C:

- < 7 = A
- 7-9 = B
- > 9 = C



Question 17 of 117

Next

A 42-year-old dentist presents to his GP complaining of persistent lethargy. Routine bloods show abnormal liver function tests so a hepatitis screen is sent. The results are shown below:

Anti-HAV IgG	negative
HBsAg	negative
Anti-HBs	positive
Anti-HBc	negative
Anti-HCV	positive

What do these results most likely demonstrate?



A. Hepatitis B infection

<input type="radio"/>	B. Hepatitis C infection
<input type="radio"/>	C. Previous vaccination to hepatitis B and C
<input checked="" type="radio"/>	D. Hepatitis C infection with previous hepatitis B vaccination
<input type="radio"/>	E. Hepatitis B and C infection

Next question

Given the deranged liver function tests these results most likely indicate previous hepatitis B vaccination with active hepatitis C infection. However, around 15% of patients exposed to the hepatitis C virus clear the infection. It would therefore be necessary to perform a HCV PCR to see if the virus is still present.

There is currently no vaccination for hepatitis C.

Interpreting hepatitis B serology:

- surface antigen (HBsAg) is the first marker to appear and causes the production of anti-HBs
- HBsAg normally implies acute disease (present for 1-6 months)
- if HBsAg is present for > 6 months then this implies chronic disease (i.e. Infective)
- Anti-HBs implies immunity (either exposure or immunisation). It is negative in chronic disease
- Anti-HBc implies previous (or current) infection. IgM anti-HBc appears during acute or recent hepatitis B infection and is present for about 6 months
- HbeAg results from breakdown of core antigen from infected liver cells as is therefore a marker of infectivity

Hepatitis C

Hepatitis C is likely to become a significant public health problem in the UK in the next decade. It is thought around 200,000 people are chronically infected with the virus. At risk groups include intravenous drug users and patients who received a blood transfusion prior to 1991 (e.g. haemophiliacs).

Pathophysiology

- hepatitis C is a RNA flavivirus

- incubation period: 6-9 weeks

Transmission

- the risk of transmission during a needle stick injury is about 2%
- the vertical transmission rate from mother to child is about 6%
- breast feeding is not contraindicated in mothers with hepatitis C
- the risk of transmitting the virus during sexual intercourse is probably less than 5%

Features

- after exposure to the hepatitis C virus less than 20% of patients develop an acute hepatitis

Complications

- chronic infection (80-85%) - only 15-20% of patients will clear the virus after an acute infection and hence the majority will develop chronic hepatitis C
- cirrhosis (20-30% of those with chronic disease)
- hepatocellular cancer
- cryoglobulinaemia
- porphyria cutanea tarda (PCT): it is increasingly recognised that PCT may develop in patients with hepatitis C, especially if there are other factors such as alcohol abuse

Management of chronic infection

- currently a combination of pegylated interferon-alpha and ribavirin are used
- up to 55% of patients successfully clear the virus, with success rates of around 80% for some strains
- the aim of treatment is sustained virological response (SVR), defined as undetectable

serum HCV RNA six months after the end of therapy

Complications of treatment

- ribavirin - side-effects: haemolytic anaemia, cough. Women should not become pregnant within 6 months of stopping ribavirin as it is teratogenic
- interferon alpha - side-effects: flu-like symptoms, depression, fatigue, leukopenia, thrombocytopenia



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Next

Which one of the following drinks contains the nearest to one unit of alcohol:



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. A 125ml glass of red wine (ABV 12%) |
| <input type="radio"/> | B. A half a pint of beer (ABV 5%) |
| <input checked="" type="radio"/> | C. A 25ml single measure of spirits (ABV 40%) |
| <input type="radio"/> | D. A pint of low strength beer (ABV 3.4%) |
| <input type="radio"/> | E. A 125ml glass of white wine (ABV 14%) |



Next question

The January 2010 AKT feedback report stated '**Candidates performed poorly in several items related to alcohol. The subject areas included alcohol units, nutrition, treatments for alcohol dependence and complications of alcohol abuse other than liver disease. The NHS Confederation has recently highlighted the increasing burden to the NHS of alcohol related problems and Candidates require a broad knowledge of this topic.**'

Alcohol: units

The government currently recommend the following:

- men: should drink no more than 21 units of alcohol per week (and no more than 4 units in any one day)
- women: should drink no more than 14 units of alcohol per week (and no more than 3 units in any one day)

One unit of alcohol is equal to 10 ml of alcohol. The 'strength' of an alcoholic drink is determined by the 'alcohol by volume' (ABV).

Examples of one unit of alcohol:

- 25ml single measure of spirits (ABV 40%)
- a third of a pint of beer (ABV 5 to 6%)
- half a 175ml 'standard' glass of red wine (ABV 12%)

To calculate the number of units in a drink multiply the number of millilitres by the ABV and divide by 1,000. For example:

- half a 175ml 'standard' glass of red wine = $87.5 * 12 / 1000 = 1.05$ units
- one bottle of wine = $750 * 12 / 1000 = 9$ units
- one pint of 5% beer or lager = $568 * 5 / 1000 = 2.8$ units



Question 19 of 117

Next

A 43-year-old man with type 2 diabetes mellitus presents with lethargy. His current medications include metformin and gliclazide, although the gliclazide may soon be stopped due to his obesity. A number of blood tests are ordered which reveal the following:

HbA1c	8.2%
Ferritin	204 ng/ml

Bilirubin	23 μ mol/l
ALP	162 u/l
ALT	120 u/l
AST	109 u/l

On discussing these results he states that he does not drink alcohol. What is the most likely cause of these abnormal results?

- ☐ A. Metformin-induced steatohepatitis
- ☐ B. Haemochromatosis
- ☐ C. Acute hepatitis secondary to gliclazide
- ☐ D. Cryptogenic cirrhosis
- ☒ E. Non-alcoholic fatty liver disease

Obese T2DM with abnormal LFTs - ? non-alcoholic fatty liver disease

By far the most likely diagnosis in an obese type 2 diabetic is non-alcoholic fatty liver disease. This patient will require a liver screen, ultrasound and liver biopsy to confirm the diagnosis.

A normal ferritin makes a diagnosis of haemochromatosis unlikely, although it should always be considered in patients with both abnormal LFTs and diabetes.

Non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease (NAFLD) is now the most common cause of liver disease in the developed world. It is largely caused by obesity and describes a spectrum of disease ranging from:

- steatosis - fat in the liver
- steatohepatitis - fat with inflammation, non-alcoholic steatohepatitis (NASH), see below
- progressive disease may cause fibrosis and liver cirrhosis

NAFLD is thought to represent the hepatic manifestation of the metabolic syndrome and hence insulin resistance is thought to be the key mechanism leading to steatosis

Non-alcoholic steatohepatitis (NASH) is a term used to describe liver changes similar to those seen in alcoholic hepatitis in the absence of a history of alcohol abuse. It is relatively common and thought to affect around 3-4% of the general population. The progression of disease in patients with NASH may be responsible for a proportion of patients previously labelled as cryptogenic cirrhosis

Associated factors

- obesity
- hyperlipidaemia
- type 2 diabetes mellitus
- jejunoileal bypass
- sudden weight loss/starvation

Features

- usually asymptomatic

- hepatomegaly
- ALT is typically greater than AST
- increased echogenicity on ultrasound

Management

- the mainstay of treatment is lifestyle changes (particularly weight loss) and monitoring
- there is ongoing research into the role of gastric banding and insulin-sensitising drugs (e.g. Metformin)



Question 20 of 117

Next

A 31-year-old man with ulcerative colitis presents with a worsening of his symptoms. He is passing around four loose stools a day which do not contain blood. He has also experienced some urgency and tenesmus but is otherwise systemically well. What is the most appropriate management?



- | | |
|----------------------------------|---------------------------------------|
| <input checked="" type="radio"/> | A. Rectal mesalazine |
| <input type="radio"/> | B. Oral metronidazole |
| <input type="radio"/> | C. Rectal corticosteroids |
| <input type="radio"/> | D. Observe with review in 7 days time |
| <input type="radio"/> | E. Oral loperamide |

Next question

Ulcerative colitis: management

Treatment can be divided into inducing and maintaining remission. NICE released guidelines on the management of ulcerative colitis in 2013.

The severity of UC is usually classified as being mild, moderate or severe:

- mild: < 4 stools/day, only a small amount of blood
- moderate: 4-6 stools/day, varying amounts of blood, no systemic upset
- severe: >6 bloody stools per day + features of systemic upset (pyrexia, tachycardia, anaemia, raised inflammatory markers)

Inducing remission

- treatment depends on the extent and severity of disease
- rectal (topical) aminosalicylates or steroids: for distal colitis rectal mesalazine has been shown to be superior to rectal steroids and oral aminosalicylates
- oral aminosalicylates
- oral prednisolone is usually used second-line for patients who fail to respond to aminosalicylates. NICE recommend waiting around 4 weeks before deciding if first-line treatment has failed
- severe colitis should be treated in hospital. Intravenous steroids are usually given first-line

Maintaining remission

- oral aminosalicylates e.g. mesalazine
- azathioprine and mercaptopurine
- methotrexate is not recommended for the management of UC (in contrast to Crohn's disease)
- there is some evidence that probiotics may prevent relapse in patients with mild to moderate disease



Question 21 of 117

Next

A 72-year-old woman is reviewed following a course of oral flucloxacillin for right lower limb cellulitis. The local protocol suggest oral clindamycin should be used next-line. Which one of the following side-effects is it most important to warn her about?



A. Heartburn or indigestion

- | | |
|----------------------------------|---|
| <input type="radio"/> | B. Jaundice |
| <input type="radio"/> | C. Sore throat, bruising or lethargy |
| <input type="radio"/> | D. Avoid any food or drink containing alcohol |
| <input checked="" type="radio"/> | E. Diarrhoea |

Next question

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea
- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



Question 22 of 117

Next

Coeliac disease should be excluded in all patients who are diagnosed with:



- ☐ A. Splenomegaly
- ☐ B. Pancreatitis
- ☐ C. Colon cancer
- ☐ D. Type 2 diabetes mellitus
- ☒ E. Graves' disease

Next question

Coeliac disease

Coeliac disease is caused by sensitivity to the protein gluten. Repeated exposure leads to villous atrophy which in turn causes malabsorption. Conditions associated with coeliac disease include dermatitis herpetiformis (a vesicular, pruritic skin eruption) and autoimmune disorders (type 1 diabetes mellitus and autoimmune hepatitis). It is strongly associated with HLA-DQ2 (95% of patients) and HLA-B8 (80%) as well as HLA-DR3 and HLA-DR7

In 2009 NICE issued guidelines on the investigation of coeliac disease. They suggest that the following patients should be screened for coeliac disease:

Signs and symptoms	Conditions
<ul style="list-style-type: none">• Chronic or intermittent diarrhoea• Failure to thrive or faltering growth (in children)• Persistent or unexplained gastrointestinal symptoms including nausea and vomiting• Prolonged fatigue ('tired all the time')• Recurrent abdominal pain, cramping or distension• Sudden or unexpected weight loss• Unexplained iron-deficiency anaemia, or other unspecified anaemia	<ul style="list-style-type: none">• Autoimmune thyroid disease• Dermatitis herpetiformis• Irritable bowel syndrome• Type 1 diabetes• First-degree relatives (parents, siblings or children) with coeliac disease

Complications

- anaemia: iron, folate and vitamin B12 deficiency (folate deficiency is more common than vitamin B12 deficiency in coeliac disease)
- hyposplenism
- osteoporosis, osteomalacia
- lactose intolerance
- enteropathy-associated T-cell lymphoma of small intestine
- subfertility, unfavourable pregnancy outcomes
- rare: oesophageal cancer, other malignancies

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Next

Theme: Dysphagia

- | | |
|-----------|-------------------------|
| A. | Pharyngeal pouch |
| B. | Achalasia |
| C. | Kaposi's sarcoma |
| D. | Systemic sclerosis |
| E. | Oesophageal cancer |
| F. | Myasthenia gravis |
| G. | Oesophagitis |
| H. | Motor neuron disease |
| I. | Oesophageal candidiasis |
| J. | Plummer-Vinson syndrome |

For each one of the following scenarios please select the most likely diagnosis:

- 23.** An 40-year-old man presents with dysphagia. He reports being reasonably well in himself other than an occasional cough. The dysphagia occurs with both liquids and solids. Clinical examination is normal.

 You answered Pharyngeal pouch

The correct answer is Achalasia

Of course patients like this should be referred to exclude a carcinoma. Achalasia typically presents between the ages of 25-40 years.

24. A 55-year-old woman presents with swallowing difficulties for the past 5 weeks. She has also noticed some double vision

 You answered Pharyngeal pouch

The correct answer is Myasthenia gravis

25. A 42-year-old haemophiliac who is known to be HIV positive presents with pain on swallowing for the past week. He has been generally unwell for the past 3 months with diarrhoea and weight loss

 You answered Pharyngeal pouch

The correct answer is Oesophageal candidiasis

Unfortunately many haemophiliacs contracted HIV and hepatitis C in the 1980's from blood transfusions. Immunocompromised patients are prone to oesophageal candidiasis. This patient requires an urgent endoscopy to confirm the diagnosis.

[Next question](#)

Dysphagia

The table below gives characteristic exam question features for conditions causing dysphagia:

Oesophageal cancer	Dysphagia may be associated with weight loss, anorexia or vomiting during eating Past history may include Barrett's oesophagus, GORD, excessive smoking or alcohol use
Oesophagitis	May be history of heartburn Odynophagia but no weight loss and systemically well
Oesophageal	There may be a history of HIV or other risk factors such as steroid inhaler use

candidiasis	
Achalasia	Dysphagia of both liquids and solids from the start Heartburn Regurgitation of food - may lead to cough, aspiration pneumonia etc
Pharyngeal pouch	More common in older men Represents a posteromedial herniation between thyropharyngeus and cricopharyngeus muscles Usually not seen but if large then a midline lump in the neck that gurgles on palpation Typical symptoms are dysphagia, regurgitation, aspiration and chronic cough. Halitosis may occasionally be seen
Systemic sclerosis	Other features of CREST syndrome may be present, namely Calcinosis, Raynaud's phenomenon, oesophageal dysmotility, Sclerodactyly, Telangiectasia As well as oesophageal dysmotility the lower oesophageal sphincter (LES) pressure is decreased. This contrasts to achalasia where the LES pressure is increased
Myasthenia gravis	Other symptoms may include extraocular muscle weakness or ptosis Dysphagia with liquids as well as solids
Globus hystericus	May be history of anxiety Symptoms are often intermittent and relieved by swallowing Usually painless - the presence of pain should warrant further investigation for organic causes



Question 26 of 117

Next

Primary biliary cirrhosis is most characteristically associated with:

- ☐ A. Anti-nuclear antibodies
- ☐ B. Anti-ribonuclear protein antibodies
- ☒ C. Anti-mitochondrial antibodies
- ☐ D. Rheumatoid factor



E. Anti-neutrophil cytoplasmic antibodies

[Next question](#)

Primary biliary cirrhosis - the **M** rule

- **IgM**
- anti-**M**itochondrial antibodies, **M2** subtype
- **M**iddle aged females

Primary biliary cirrhosis

Primary biliary cirrhosis is a chronic liver disorder typically seen in middle-aged females (female:male ratio of 9:1). The aetiology is not fully understood although it is thought to be an autoimmune condition. Interlobular bile ducts become damaged by a chronic inflammatory process causing progressive cholestasis which may eventually progress to cirrhosis. The classic presentation is itching in a middle-aged woman

Associations

- Sjogren's syndrome (seen in up to 80% of patients)
- rheumatoid arthritis
- systemic sclerosis
- thyroid disease

Diagnosis

- anti-mitochondrial antibodies (AMA) M2 subtype are present in 98% of patients and are highly specific
- smooth muscle antibodies in 30% of patients
- raised serum IgM

Management

- pruritus: cholestyramine

- fat-soluble vitamin supplementation
- ursodeoxycholic acid
- liver transplantation e.g. if bilirubin > 100 (PBC is a major indication) - recurrence in graft can occur but is not usually a problem



Question 27 of 117

Next

You wish to screen a patient for hepatitis B infection. Which one of the following is the most suitable test to perform?



- | | |
|----------------------------------|---------------------------|
| <input type="radio"/> | A. HBcAg |
| <input checked="" type="radio"/> | B. HBsAg |
| <input type="radio"/> | C. Hepatitis B viral load |
| <input type="radio"/> | D. anti-HBs |
| <input type="radio"/> | E. HBeAg |

Next question

A positive anti-HBs would imply immunity through either previous immunisation or disease. A positive HBsAg implies either acute or chronic hepatitis B.

Hepatitis B serology

Interpreting hepatitis B serology is a dying art form which still occurs at regular intervals in medical exams. It is important to remember a few key facts:

- surface antigen (HBsAg) is the first marker to appear and causes the production of anti-HBs
- HBsAg normally implies acute disease (present for 1-6 months)
- if HBsAg is present for > 6 months then this implies chronic disease (i.e. Infective)
- Anti-HBs implies immunity (either exposure or immunisation). It is negative in chronic disease

- Anti-HBc implies previous (or current) infection. IgM anti-HBc appears during acute or recent hepatitis B infection and is present for about 6 months. IgG anti-HBc persists
- HbeAg results from breakdown of core antigen from infected liver cells as is therefore a marker of infectivity

Example results

- previous immunisation: anti-HBs positive, all others negative
- previous hepatitis B (> 6 months ago), not a carrier: anti-HBc positive, HBsAg negative
- previous hepatitis B, now a carrier: anti-HBc positive, HBsAg positive

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Theme: Diarrhoea

A.	Gastroenteritis
B.	Crohn's disease
C.	Ulcerative colitis
D.	Colorectal cancer
E.	Laxative abuse
F.	Constipation causing overflow
G.	Lactose intolerance
H.	Diverticulitis
I.	Irritable bowel syndrome
J.	Coeliac disease

For each one of the following scenarios please select the most likely diagnosis:

- 28.** A 24-year-old smoker presents with intermittent diarrhoea for the past 6 months. She feels bloated, especially around her periods. Bloods tests are normal.

 You answered Gastroenteritis

The correct answer is Irritable bowel syndrome

Irritable bowel syndrome is by far the most likely diagnosis here.

29. A 23-year-old student is admitted due to a two-week history of bloody diarrhoea. He is normally fit and well and has not been abroad recently. His CRP is raised at 56 on admission.



You answered Gastroenteritis

The correct answer is Ulcerative colitis

The duration of his symptoms make a diagnosis of gastroenteritis less likely. The presence of blood in the diarrhoea points to a diagnosis of ulcerative colitis rather than Crohn's.

30. A 72-year-old woman presents with a two day history of diarrhoea and pain in the left iliac fossa. Her temperature is 37.8°C. She has a past history of constipation.



You answered Gastroenteritis

The correct answer is Diverticulitis

This is a typical history of diverticulitis

[Next question](#)

Diarrhoea

The table below gives characteristic features for conditions causing diarrhoea:

Usually acute

Gastroenteritis	May be accompanied by abdominal pain or nausea/vomiting
Diverticulitis	Classically causes left lower quadrant pain, diarrhoea and fever
Antibiotic therapy	More common with broad spectrum antibiotics <i>Clostridium difficile</i> is also seen with antibiotic use

Constipation causing overflow	<p>A history of alternating diarrhoea and constipation may be given</p> <p>May lead to faecal incontinence in the elderly</p>
--------------------------------------	---

Usually chronic

Irritable bowel syndrome	<p>Extremely common. The most consistent features are abdominal pain, bloating and change in bowel habit. Patients may be divided into those with diarrhoea predominant IBS and those with constipation predominant IBS.</p> <p>Features such as lethargy, nausea, backache and bladder symptoms may also be present</p>
Ulcerative colitis	Bloody diarrhoea may be seen. Crampy abdominal pain and weight loss are also common. Faecal urgency and tenesmus may be seen
Crohn's disease	Crampy abdominal pains and diarrhoea. Bloody diarrhoea less common than in ulcerative colitis. Other features include malabsorption, mouth ulcers perianal disease and intestinal obstruction
Colorectal cancer	Symptoms depend on the site of the lesion but include diarrhoea, rectal bleeding, anaemia and constitutional symptoms e.g. Weight loss and anorexia
Coeliac disease	<p>In children may present with failure to thrive, diarrhoea and abdominal distension</p> <p>In adults lethargy, anaemia, diarrhoea and weight loss are seen. Other autoimmune conditions may coexist</p>

Other conditions associated with diarrhoea include:

- thyrotoxicosis
- laxative abuse
- appendicitis



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Next

A 23-year-old man develops watery diarrhoea whilst travelling in Egypt.
Which one of the following is the most likely responsible organism?

- ☐ A. *Salmonella*
- ☐ B. *Shigella*
- ☐ C. *Campylobacter*
- ✓ ☒ D. *Escherichia coli*
- ☐ E. *Bacillus cereus*

[Next question](#)

E. coli is the most common cause of travellers' diarrhoea

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea

	Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



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Next

A 54-year-old man is investigated for dyspepsia. An endoscopy shows a gastric ulcer and a CLO test done during the procedure demonstrates *H. pylori* infection. A course of *H. pylori* eradication

therapy is given. Six weeks after completing treatment the patients comes for review. Unfortunately his symptoms have not improved. What is the most appropriate test to confirm *H. pylori* eradication?

- | | |
|----------------------------------|------------------------------|
| <input type="radio"/> | A. Culture of gastric biopsy |
| <input type="radio"/> | B. <i>H. pylori</i> serology |
| <input type="radio"/> | C. Hydrogen breath test |
| <input checked="" type="radio"/> | D. Urea breath test |
| <input type="radio"/> | E. Stool culture |

Next question

It is important to remember that *H. pylori* serology remains positive following eradication.

A stool antigen test, not culture, may be an appropriate alternative.

***Helicobacter pylori*: tests**

Urea breath test

- patients consume a drink containing carbon isotope 13 (¹³C) enriched urea
- urea is broken down by *H. pylori* urease
- after 30 mins patient exhale into a glass tube
- mass spectrometry analysis calculates the amount of ¹³C CO₂
- should not be performed within 4 weeks of treatment with an antibacterial or within 2 weeks of an antiseecretory drug (e.g. a proton pump inhibitor)
- sensitivity 95-98%, specificity 97-98%

Rapid urease test (e.g. CLO test)

- biopsy sample is mixed with urea and pH indicator
- colour change if *H. pylori* urease activity
- sensitivity 90-95%, specificity 95-98%

Serum antibody

- remains positive after eradication

- sensitivity 85%, specificity 80%

Culture of gastric biopsy

- provide information on antibiotic sensitivity
- sensitivity 70%, specificity 100%

Gastric biopsy

- histological evaluation alone, no culture
- sensitivity 95-99%, specificity 95-99%

Stool antigen test

- sensitivity 90%, specificity 95%



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Next

A 26-year-old woman who is known to have type 1 diabetes mellitus presents with a three-month history of diarrhoea, fatigue and weight loss. She has tried excluding gluten from her diet for the past 4 weeks and feels much better. She requests to be tested so that a diagnosis of coeliac disease is confirmed. What is the most appropriate next step?



<input type="radio"/>	A. Check her HbA1c
<input type="radio"/>	B. No need for further investigation as the clinical response is diagnostic
<input type="radio"/>	C. Check anti-endomysial antibodies
<input type="radio"/>	D. Arrange a jejunal biopsy
<input checked="" type="radio"/>	E. Ask her to reintroduce gluten for the next 6 weeks before further testing

Next question

Serological tests and jejunal biopsy may be negative if the patient is following a gluten-free diet. The patient should eat some gluten in more than one meal every day for at least 6 weeks before further testing.

Coeliac disease: investigation

Coeliac disease is caused by sensitivity to the protein gluten. Repeated exposure leads to villous atrophy which in turn causes malabsorption. Conditions associated with coeliac disease include dermatitis herpetiformis (a vesicular, pruritic skin eruption) and autoimmune disorders (type 1 diabetes mellitus and autoimmune hepatitis).

Diagnosis is made by a combination of immunology and jejunal biopsy. Villous atrophy and immunology normally reverses on a gluten-free diet.

NICE issued guidelines on the investigation of coeliac disease in 2009. If patients are already taking a gluten-free diet they should be asked, if possible, to reintroduce gluten for at least 6 weeks prior to testing.

Immunology

- tissue transglutaminase (TTG) antibodies (IgA) are first-choice according to NICE
- endomysial antibody (IgA)
- anti-gliadin antibody (IgA or IgG) tests are not recommended by NICE
- anti-casein antibodies are also found in some patients

Jejunal biopsy

- villous atrophy
- crypt hyperplasia
- increase in intraepithelial lymphocytes
- lamina propria infiltration with lymphocytes

Rectal gluten challenge has been described but is not widely used



A 44-year-old man is diagnosed with a duodenal ulcer. CLO testing performed during the gastroscopy is positive for *Helicobacter pylori*. What is the most appropriate management to eradicate *Helicobacter pylori*?

-  ☐ A. Lansoprazole + clindamycin + metronidazole
- ☐ B. Lansoprazole + amoxicillin + clindamycin
-  ☒ C. Lansoprazole + amoxicillin + clarithromycin
- ☐ D. Omeprazole + amoxicillin + clindamycin
- ☐ E. Omeprazole + penicillin + metronidazole

[Next question](#)

H. pylori eradication:

- PPI + amoxicillin + clarithromycin, or
- PPI + metronidazole + clarithromycin

The BNF recommends a regimen containing amoxicillin and clarithromycin as first-line therapy

Helicobacter pylori

Helicobacter pylori is a Gram negative bacteria associated with a variety of gastrointestinal problems, principally peptic ulcer disease

Associations

- peptic ulcer disease (95% of duodenal ulcers, 75% of gastric ulcers)
- gastric cancer
- B cell lymphoma of MALT tissue (eradication of *H pylori* results causes regression in 80% of patients)
- atrophic gastritis

The role of *H pylori* in Gastro-oesophageal reflux disease (GORD) is unclear - there is currently no role in GORD for the eradication of *H pylori*

Management - eradication may be achieved with a 7 day course of

- a proton pump inhibitor + amoxicillin + clarithromycin, or
- a proton pump inhibitor + metronidazole + clarithromycin



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Next

A 27-year-old woman presents for review. She describes herself as having 'IBS' and for the past two years has suffered intermittent bouts of abdominal pain, bloating and loose stools. For the past two weeks however her symptoms have been much worse. She is now passing around 3-4 watery, grey, 'frothy' stools per day. Her abdominal bloating and cramps have also worsened and she is suffering from excessive flatulence. Judging by the fitting of her clothes she also feels that she has lost weight. Some blood tests are ordered:

Hb	10.9 g/dl
Platelets	$199 \times 10^9/l$
WBC	$7.2 \times 10^9/l$
Ferritin	15 ng/ml
Vitamin B12	225 ng/l
Folate	2.1 nmol/l

What is the most likely diagnosis?



- ☐ A. Crohn's disease
- ☒ B. Coeliac disease
- ☐ C. Infective exacerbation of irritable bowel syndrome
- ☐ D. Ulcerative colitis
- ☐ E. Bacterial overgrowth syndrome

Next question

The main clues in this question are the anaemia and low ferritin/folate levels, all characteristic of coeliac disease. The description of the diarrhoea is also typical although some patients may have more overtly 'fatty' stools.

Why not irritable bowel syndrome? Common things are common and atypical presentations of common conditions are seen more than typical presentations of less common conditions. The main reason is the bloods - a low ferritin and folate would not develop with IBS +/- gastroenteritis. Even if the woman suffered from menorrhagia this would not explain the low folate although it may account for the anaemia/low ferritin.

Coeliac disease is more common than Crohn's by a factor of around 100. In exams there are also usually more clues to point towards a diagnosis of Crohn's (e.g. mouth ulcers etc).

Coeliac disease

Coeliac disease is caused by sensitivity to the protein gluten. Repeated exposure leads to villous atrophy which in turn causes malabsorption. Conditions associated with coeliac disease include dermatitis herpetiformis (a vesicular, pruritic skin eruption) and autoimmune disorders (type 1 diabetes mellitus and autoimmune hepatitis). It is strongly associated with HLA-DQ2 (95% of patients) and HLA-B8 (80%) as well as HLA-DR3 and HLA-DR7

In 2009 NICE issued guidelines on the investigation of coeliac disease. They suggest that the following patients should be screened for coeliac disease:

Signs and symptoms	Conditions
<ul style="list-style-type: none">• Chronic or intermittent diarrhoea• Failure to thrive or faltering growth (in children)• Persistent or unexplained gastrointestinal symptoms including nausea and vomiting• Prolonged fatigue ('tired all the time')• Recurrent abdominal pain, cramping or distension• Sudden or unexpected weight loss• Unexplained iron-deficiency anaemia, or other unspecified anaemia	<ul style="list-style-type: none">• Autoimmune thyroid disease• Dermatitis herpetiformis• Irritable bowel syndrome• Type 1 diabetes• First-degree relatives (parents, siblings or children) with coeliac disease

Complications

- anaemia: iron, folate and vitamin B12 deficiency (folate deficiency is more common than vitamin B12 deficiency in coeliac disease)
- hyposplenism
- osteoporosis, osteomalacia
- lactose intolerance
- enteropathy-associated T-cell lymphoma of small intestine
- subfertility, unfavourable pregnancy outcomes
- rare: oesophageal cancer, other malignancies



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Next

A 59-year-old female presents to her GP with a two month history of indigestion. She is otherwise well, has not had a similar episode before and takes no regular medication. Of note there is no recent weight loss or vomiting and abdominal examination is unremarkable. What is the most appropriate initial management?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Long-term course of a H2 receptor antagonist |
| <input type="radio"/> | B. Lifestyle advice with follow-up appointment in one month |
| <input checked="" type="radio"/> | C. Urgent referral for endoscopy |
| <input type="radio"/> | D. One month course of a full-dose proton pump inhibitor |
| <input type="radio"/> | E. Urea breath testing and treat for H pylori if positive |

Next question

This patient meets the criteria for urgent referral for endoscopy as she is older than 55 years, has recent onset, persistent and unexplained symptoms

Dyspepsia

In 2014 NICE updated their guidelines for the management of dyspepsia. These take into account the age of the patient (whether younger or older than 55 years) and the presence or absence of 'alarm signs':

- chronic gastrointestinal bleeding

- progressive unintentional weight loss
- progressive difficulty swallowing
- persistent vomiting
- iron deficiency anaemia
- epigastric mass
- suspicious barium meal

Deciding whether urgent referral for endoscopy is needed

Urgent referral (within 2 weeks) is indicated for patients with any alarm signs irrespective of age

Routine endoscopic investigation of patients of any age, presenting with dyspepsia and without alarm signs is not necessary, however

Patients aged 55 years and over should be referred urgently for endoscopy if dyspepsia symptoms are:

- recent in onset rather than recurrent and
- unexplained (e.g. New symptoms which cannot be explained by precipitants such as NSAIDs) and
- persistent: continuing beyond a period that would normally be associated with self-limiting problems (e.g. Up to four to six weeks, depending on the severity of signs and symptoms)

Managing patients who do not meet referral criteria ('undiagnosed dyspepsia')

This can be summarised at a step-wise approach

- 1. Review medications for possible causes of dyspepsia
- 2. Lifestyle advice
- 3. Trial of full-dose PPI for one month*
- 4. 'Test and treat' using carbon-13 urea breath test

*it is unclear from studies whether a trial of a PPI or a 'test and treat' should be used first



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Next

A 36-year-old man is reviewed in clinic. He has recently been started on mesalazine 400mg tds for ulcerative colitis. Which one of the following adverse effects is least likely to be attributable to mesalazine?



- | | |
|----------------------------------|---------------------------|
| <input type="radio"/> | A. Interstitial nephritis |
| <input type="radio"/> | B. Headaches |
| <input type="radio"/> | C. Acute pancreatitis |
| <input type="radio"/> | D. Agranulocytosis |
| <input checked="" type="radio"/> | E. Infertility |

Next question

Oligospermia is seen in patients taking sulphasalazine due to the sulphapyridine moiety, which is not present in mesalazine

Aminosalicylate drugs

5-aminosalicylic acid (5-ASA) is released in the colon and is not absorbed. It acts locally as an anti-inflammatory. The mechanism of action is not fully understood but 5-ASA may inhibit prostaglandin synthesis

Sulphasalazine

- a combination of sulphapyridine (a sulphonamide) and 5-ASA
- many side-effects are due to the sulphapyridine moiety: rashes, oligospermia, headache, Heinz body anaemia, megaloblastic anaemia
- other side-effects are common to 5-ASA drugs (see mesalazine)

Mesalazine

- a delayed release form of 5-ASA
- sulphapyridine side-effects seen in patients taking sulphasalazine are avoided
- mesalazine is still however associated with side-effects such as GI upset, headache, agranulocytosis, pancreatitis*, interstitial nephritis

Olsalazine

- two molecules of 5-ASA linked by a diazo bond, which is broken by colonic bacteria

*pancreatitis is 7 times more common in patients taking mesalazine than sulfasalazine



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Next

A 31-year-old woman is reviewed in surgery with an 8 month history of abdominal discomfort associated with bloating. Which one of the following tests is it least useful to perform before making a positive diagnosis of irritable bowel syndrome?



<input type="radio"/>	A. Erythrocyte sedimentation rate
<input checked="" type="radio"/>	B. Thyroid function tests
<input type="radio"/>	C. Full blood count
<input type="radio"/>	D. C-reactive protein
<input type="radio"/>	E. Tissue transglutaminase antibodies

Next question

NICE recommends that thyroid function tests are not necessary prior to making a positive diagnosis of IBS. Erythrocyte sedimentation rate and C-reactive protein may help exclude inflammatory bowel disease.

Irritable bowel syndrome: diagnosis

NICE published clinical guidelines on the diagnosis and management of irritable bowel syndrome (IBS) in 2008

The diagnosis of IBS should be considered if the patient has had the following for at least 6 months:

- abdominal pain, and/or
- bloating, and/or
- change in bowel habit

A positive diagnosis of IBS should be made if the patient has abdominal pain relieved by defecation or associated with altered bowel frequency stool form, in addition to 2 of the following 4 symptoms:

- altered stool passage (straining, urgency, incomplete evacuation)
- abdominal bloating (more common in women than men), distension, tension or hardness
- symptoms made worse by eating
- passage of mucus

Features such as lethargy, nausea, backache and bladder symptoms may also support the diagnosis

Red flag features should be enquired about:

- rectal bleeding
- unexplained/unintentional weight loss
- family history of bowel or ovarian cancer
- onset after 60 years of age

Suggested primary care investigations are:

- full blood count
- ESR/CRP
- coeliac disease screen (tissue transglutaminase antibodies)



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Next

A 30-year-old woman presents with a three month history of indigestion. There is no history of weight loss, anorexia, dysphagia, vomiting or change in bowel habit and abdominal examination is unremarkable. Which one of the following may decrease the accuracy of a ¹³C-urea breath test?

☐

A. Use of Gaviscon around 10 days ago

☐

B. Use of ranitidine stopping 4 weeks ago

☒

C. Course of amoxicillin stopping 3 weeks ago

☐

D. Use of lansoprazole stopping 6 weeks ago

☐

E. Current use of the combined oral contraceptive pill

Next question

Urea breath test - no antibiotics in past 4 weeks, no antisecretory drugs (e.g. PPI) in past 2 weeks

***Helicobacter pylori*: tests**

Urea breath test

- patients consume a drink containing carbon isotope 13 (^{13}C) enriched urea
- urea is broken down by *H. pylori* urease
- after 30 mins patient exhale into a glass tube
- mass spectrometry analysis calculates the amount of ^{13}C CO_2
- should not be performed within 4 weeks of treatment with an antibacterial or within 2 weeks of an antisecretory drug (e.g. a proton pump inhibitor)
- sensitivity 95-98%, specificity 97-98%

Rapid urease test (e.g. CLO test)

- biopsy sample is mixed with urea and pH indicator
- colour change if *H. pylori* urease activity
- sensitivity 90-95%, specificity 95-98%

Serum antibody

- remains positive after eradication
- sensitivity 85%, specificity 80%

Culture of gastric biopsy

- provide information on antibiotic sensitivity
- sensitivity 70%, specificity 100%

Gastric biopsy

- histological evaluation alone, no culture
- sensitivity 95-99%, specificity 95-99%

Stool antigen test

- sensitivity 90%, specificity 95%



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Next

A 54-year-old female presents to her GP with fatigue and xerostomia. Bloods tests reveal the following:

Hb	13.9 g/dl
WBC	6.1 *10 ⁹ /l
Platelets	246 *10 ⁹ /l
Bilirubin	33 µmol/l
ALP	292 u/l
ALT	47 u/l

What is the most likely diagnosis?



A. Systemic lupus erythematosus

<input type="radio"/>	B. Infectious mononucleosis
✓ <input checked="" type="radio"/>	C. Primary biliary cirrhosis
<input type="radio"/>	D. Autoimmune hepatitis
<input type="radio"/>	E. Primary Sjogren's syndrome

Next question

Primary biliary cirrhosis - the **M** rule

- **IgM**
- anti-Mitochondrial antibodies, **M2** subtype
- **M**iddle aged females

The dry mouth in this patient is due to sicca syndrome, which occurs in 70% of cases of primary biliary cirrhosis. The raised alkaline phosphatase points towards a diagnosis of primary biliary cirrhosis rather than primary Sjogren's syndrome.

Primary biliary cirrhosis: features

Primary biliary cirrhosis is a chronic liver disorder typically seen in middle-aged females (female:male ratio of 9:1). The aetiology is not fully understood although it is thought to be an autoimmune condition. Interlobular bile ducts become damaged by a chronic inflammatory process causing progressive cholestasis, which may eventually progress to cirrhosis. The classic presentation is itching in a middle-aged woman.

Clinical features

- early: may be asymptomatic (e.g. raised ALP on routine LFTs) or fatigue, pruritus
- cholestatic jaundice
- hyperpigmentation, especially over pressure points
- xanthelasma, xanthomata
- also: clubbing, hepatosplenomegaly
- late: may progress to liver failure

Complications

- malabsorption: osteomalacia, coagulopathy
- sicca syndrome occurs in 70% of cases
- portal hypertension: ascites, variceal haemorrhage
- hepatocellular cancer (20-fold increased risk)



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Next

A 35-year-old woman is noticed to be jaundiced. As part of a liver screen the following results are obtained:

Anti-HBs	Positive
Anti-HBc	Positive
HBs antigen	Negative

Anti-HBs = Hepatitis B Surface Antibody; Anti-HBc = Hepatitis B Core Antibody; HBs antigen = Hepatitis B Surface Antigen

What is the patient's hepatitis B status?



- ☐ A. Previous immunisation to hepatitis B
- ☐ B. Chronic hepatitis B - highly infectious
- ☒ C. Previous hepatitis B infection, not a carrier
- ☐ D. Chronic hepatitis B - not infectious
- ☐ E. Acute hepatitis B infection

Next question

A positive anti-HBs shows that the patient has been exposed to hepatitis B in the past (infection or immunisation) and has developed immunity. The negative HBs antigen supports the fact that they are not carriers and do not have chronic disease. The presence of anti-HBc implies previous infection, rather than immunisation.

Hepatitis B serology

Interpreting hepatitis B serology is a dying art form which still occurs at regular intervals in medical exams. It is important to remember a few key facts:

- surface antigen (HBsAg) is the first marker to appear and causes the production of anti-HBs
- HBsAg normally implies acute disease (present for 1-6 months)
- if HBsAg is present for > 6 months then this implies chronic disease (i.e. Infective)
- Anti-HBs implies immunity (either exposure or immunisation). It is negative in chronic disease
- Anti-HBc implies previous (or current) infection. IgM anti-HBc appears during acute or recent hepatitis B infection and is present for about 6 months. IgG anti-HBc persists
- HbeAg results from breakdown of core antigen from infected liver cells as is therefore a marker of infectivity

Example results

- previous immunisation: anti-HBs positive, all others negative
- previous hepatitis B (> 6 months ago), not a carrier: anti-HBc positive, HBsAg negative
- previous hepatitis B, now a carrier: anti-HBc positive, HBsAg positive

0 / 3

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Next

Theme: Hepatobiliary disease and related disorders

- | | |
|----|-------------------------|
| A. | Ascending cholangitis |
| B. | Acute cholecystitis |
| C. | Biliary colic |
| D. | Amoebic liver abscess |
| E. | Pancreatic cancer |
| F. | Viral hepatitis |
| G. | Congestive hepatomegaly |
| H. | Cholangiocarcinoma |
| I. | Gallstone ileus |

J. Acute pancreatitis

For each of the following scenarios please select the most likely diagnosis:

42. A woman who is known to have gallstones presents with pain in her right upper quadrant. On examination she is not jaundiced and has a temperature of 37.8°C. Palpating under the right costal margin causes her to catch her breath.

 You answered Ascending cholangitis

The correct answer is Acute cholecystitis

This scenario describes Murphy's sign.

43. A 72-year-old man who is known to have heart failure and type 2 diabetes mellitus presents with a persistent dull ache in his right upper quadrant. Blood tests show a mild elevation of the alanine aminotransferase level.

 You answered Ascending cholangitis

The correct answer is Congestive hepatomegaly

This patient is likely to have congestive hepatomegaly secondary to heart failure.

44. A 23-year-old student who has recently returned from a trip to North Africa presents with anorexia, nausea, mild right upper quadrant pain and lethargy. Blood tests show a marked elevation of his alanine aminotransferase level.

 You answered Ascending cholangitis

The correct answer is Viral hepatitis

[Next question](#)

Hepatobiliary disease and related disorders

The table below gives characteristic exam question features for conditions causing hepatobiliary disease and related disorders:

Viral hepatitis	<p>Common symptoms include:</p> <ul style="list-style-type: none"> • nausea and vomiting, anorexia • myalgia • lethargy • right upper quadrant (RUQ) pain <p>Questions may point to risk factors such as foreign travel or intravenous drug use.</p>
Congestive hepatomegaly	<p>The liver only usually causes pain if stretched. One common way this can occur is as a consequence of congestive heart failure. In severe cases cirrhosis may occur.</p>
Biliary colic	<p>RUQ pain, intermittent, usually begins abruptly and subsides gradually. Attacks often occur after eating. Nausea is common.</p> <p>It is sometimes taught that patients are female, forties, fat and fair although this is obviously a generalisation.</p>
Acute cholecystitis	<p>Pain similar to biliary colic but more severe and persistent. The pain may radiate to the back or right shoulder.</p> <p>The patient may be pyrexial and Murphy's sign positive (arrest of inspiration on palpation of the RUQ)</p>
Ascending cholangitis	<p>An infection of the bile ducts commonly secondary to gallstones. Classically presents with a triad of:</p> <ul style="list-style-type: none"> • fever (rigors are common) • RUQ pain • jaundice
Gallstone ileus	<p>This describes small bowel obstruction secondary to an impacted gallstone. It may develop if a fistula forms between a gangrenous gallbladder and the duodenum.</p> <p>Abdominal pain, distension and vomiting are seen.</p>
Cholangiocarcinoma	<p>Persistent biliary colic symptoms, associated with anorexia, jaundice and weight loss. A palpable mass in the right upper quadrant (Courvoisier sign), periumbilical lymphadenopathy (Sister Mary Joseph nodes) and left supraclavicular adenopathy (Virchow node) may be seen</p>
Acute pancreatitis	<p>Usually due to alcohol or gallstones</p> <p>Severe epigastric pain</p>

	<p>Vomiting is common</p> <p>Examination may reveal tenderness, ileus and low-grade fever</p> <p>Periumbilical discolouration (Cullen's sign) and flank discolouration (Grey-Turner's sign) is described but rare</p>
Pancreatic cancer	<p>Painless jaundice is the classical presentation of pancreatic cancer. However pain is actually a relatively common presenting symptom of pancreatic cancer. Anorexia and weight loss are common</p>
Amoebic liver abscess	<p>Typical symptoms are malaise, anorexia and weight loss. The associated RUQ pain tends to be mild and jaundice is uncommon.</p>



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Next

What is the most appropriate advice to give a man with regards to alcohol intake?

- ☐ A. No more than 14 units of alcohol per week (and no more than 2 units in any one day)
- ☐ B. No more than 14 units of alcohol per week (and no more than 4 units in any one day)
- ☒ C. No more than 21 units of alcohol per week (and no more than 4 units in any one day)
- ☐ D. No more than 21 units of alcohol per week
- ☐ E. No more than 21 units of alcohol per week (and no more than 3 units in any one day)

Next question

The January 2010 AKT feedback report stated '**Candidates performed poorly in several items related to alcohol. The subject areas included alcohol units, nutrition, treatments for alcohol dependence and complications of alcohol abuse other than liver disease. The NHS Confederation has recently highlighted the increasing burden to the NHS of alcohol related problems and Candidates require a broad knowledge of this topic.**'

Alcohol: units

The government currently recommend the following:

- men: should drink no more than 21 units of alcohol per week (and no more than 4 units in any one day)
- women: should drink no more than 14 units of alcohol per week (and no more than 3 units in any one day)

One unit of alcohol is equal to 10 ml of alcohol. The 'strength' of an alcoholic drink is determined by the 'alcohol by volume' (ABV).

Examples of one unit of alcohol:

- 25ml single measure of spirits (ABV 40%)
- a third of a pint of beer (ABV 5 to 6%)
- half a 175ml 'standard' glass of red wine (ABV 12%)

To calculate the number of units in a drink multiply the number of millilitres by the ABV and divide by 1,000. For example:

- half a 175ml 'standard' glass of red wine = $87.5 * 12 / 1000 = 1.05$ units
- one bottle of wine = $750 * 12 / 1000 = 9$ units
- one pint of 5% beer or lager = $568 * 5 / 1000 = 2.8$ units



Question 46 of 117

Next

A 45-year-old man with a history of alcohol excess is diagnosed as having grade 3 oesophageal varices during an outpatient endoscopy. Of the following options, what is the most appropriate management to prevent variceal bleeding?



A. Propranolol

<input type="radio"/>	B. Isosorbide mononitrate
<input type="radio"/>	C. Endoscopic sclerotherapy
<input type="radio"/>	D. Terlipressin
<input type="radio"/>	E. Lansoprazole

Next question

Endoscopic sclerotherapy now has little role in the prophylaxis of variceal haemorrhage.

Oesophageal varices

Acute treatment of variceal haemorrhage

- ABC: patients should ideally be resuscitated prior to endoscopy
- correct clotting: FFP, vitamin K
- vasoactive agents: terlipressin is currently the only licensed vasoactive agent and is supported by NICE guidelines. It has been shown to be of benefit in initial haemostasis and preventing rebleeding. Octreotide may also be used although there is some evidence that terlipressin has a greater effect on reducing mortality
- prophylactic antibiotics have been shown in multiple meta-analyses to reduce mortality in patients with liver cirrhosis
- endoscopy: endoscopic variceal band ligation is superior to endoscopic sclerotherapy. NICE recommend band ligation
- Sengstaken-Blakemore tube if uncontrolled haemorrhage
- Transjugular Intrahepatic Portosystemic Shunt (TIPSS) if above measures fail

Prophylaxis of variceal haemorrhage

- propranolol: reduced rebleeding and mortality compared to placebo
- endoscopic variceal band ligation (EVL) is superior to endoscopic sclerotherapy. It should be performed at two-weekly intervals until all varices have been eradicated. Proton pump inhibitor cover is given to prevent EVL-induced ulceration



Question 47 of 117

Next

You are doing a new patient consultation for an 81-year-old man who has recently joined the practice. You notice that he is very thin and wonder if he may be malnourished. According to NICE, what is the cut-off body mass index (BMI) for diagnosing malnutrition?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. < 17 kg/m ² |
| <input type="radio"/> | B. < 17.5 kg/m ² |
| <input checked="" type="radio"/> | C. < 18 kg/m ² |
| <input checked="" type="radio"/> | D. < 18.5 kg/m ² |
| <input type="radio"/> | E. < 19 kg/m ² |

Next question

Malnutrition

Malnutrition is an important consequence of and contributor to chronic disease. It is clearly a complex and multifactorial problem that can be difficult to manage but there are a number of key points to remember for the exam.

NICE define malnutrition as the following:

- a Body Mass Index (BMI) of less than 18.5; or
- unintentional weight loss greater than 10% within the last 3-6 months; or
- a BMI of less than 20 and unintentional weight loss greater than 5% within the last 3-6 months

Around 10% of patients aged over 65 years are malnourished, the vast majority of those living independently, i.e. not in hospital or care/nursing homes.

Screening for malnutrition is mostly done using MUST (Malnutrition Universal Screen Tool). A link is provided to a copy of the MUST score algorithm.

- it should be done on admission to care/nursing homes and hospital, or if there is concern.
For example an elderly, thin patient with pressure sores
- it takes into account BMI, recent weight change and the presence of acute disease
- categorises patients into low, medium and high risk

Management of malnutrition is difficult. NICE recommend the following points:

- dietician support if the patient is high-risk
- a 'food-first' approach with clear instructions (e.g. 'add full-fat cream to mashed potato'), rather than just prescribing oral nutritional supplements (ONS) such as Ensure
- if ONS are used they should be taken between meals, rather than instead of meals



Question 48 of 117

Next

According to recent NICE guidelines, which one of the following may have a role in the management of irritable bowel syndrome?



- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. Reflexology |
| <input type="radio"/> | B. Acupuncture |
| <input type="radio"/> | C. Aloe vera |
| <input type="radio"/> | D. Homeopathy |
| <input checked="" type="radio"/> | E. Hypnotherapy |



Next question

Irritable bowel syndrome: management

The management of irritable bowel syndrome (IBS) is often difficult and varies considerably between patients. NICE issued guidelines in 2008

First-line pharmacological treatment - according to predominant symptom

- pain: antispasmodic agents
- constipation: laxatives but avoid lactulose
- diarrhoea: loperamide is first-line

Second-line pharmacological treatment

- low-dose tricyclic antidepressants (e.g. amitriptyline 5-10 mg) are used in preference to selective serotonin reuptake inhibitors

Other management options

- psychological interventions - if symptoms do not respond to pharmacological treatments after 12 months and who develop a continuing symptom profile (refractory IBS), consider referring for cognitive behavioural therapy, hypnotherapy or psychological therapy
- complementary and alternative medicines: 'do not encourage use of acupuncture or reflexology for the treatment of IBS'

General dietary advice

- have regular meals and take time to eat
- avoid missing meals or leaving long gaps between eating
- drink at least 8 cups of fluid per day, especially water or other non-caffeinated drinks such as herbal teas
- restrict tea and coffee to 3 cups per day
- reduce intake of alcohol and fizzy drinks
- consider limiting intake of high-fibre food (for example, wholemeal or high-fibre flour and breads, cereals high in bran, and whole grains such as brown rice)
- reduce intake of 'resistant starch' often found in processed foods
- limit fresh fruit to 3 portions per day
- for diarrhoea, avoid sorbitol
- for wind and bloating consider increasing intake of oats (for example, oat-based

breakfast cereal or porridge) and linseeds (up to one tablespoon per day).



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Next

Which one of the following regarding the FAST questionnaire for alcohol misuse is correct?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. May be stopped after first question depending on the answer |
| <input type="radio"/> | B. The minimum score is 4 |
| <input type="radio"/> | C. Consists of 5 questions |
| <input type="radio"/> | D. The maximum score is 20 |
| <input type="radio"/> | E. The score for hazardous drinking is 7 or more |

Next question

Alcohol - problem drinking: detection and assessment

Screening

AUDIT

- 10 item questionnaire, please see the link
- takes about 2-3 minutes to complete
- has been shown to be superior to CAGE and biochemical markers for predicting alcohol problems
- minimum score = 0, maximum score = 40
- a score of 8 or more in men, and 7 or more in women, indicates a strong likelihood of hazardous or harmful alcohol consumption
- a score of 15 or more in men, and 13 or more in women, is likely to indicate alcohol dependence
- AUDIT-C is an abbreviated form consisting of 3 questions

FAST

- 4 item questionnaire
- minimum score = 0, maximum score = 16
- the score for hazardous drinking is 3 or more

- with relation to the first question 1 drink = 1/2 pint of beer or 1 glass of wine or 1 single spirits
- if the answer to the first question is 'never' then the patient is not misusing alcohol
- if the response to the first question is 'Weekly' or 'Daily or almost daily' then the patient is a hazardous, harmful or dependent drinker. Over 50% of people will be classified using just this one question

1	MEN: How often do you have EIGHT or more drinks on one occasion? WOMEN: How often do you have SIX or more drinks on one occasion?
2	How often during the last year have you been unable to remember what happened the night before because you had been drinking?
3	How often during the last year have you failed to do what was normally expected of you because of drinking?
4	In the last year has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?

CAGE

- well known but recent research has questioned it's value as a screening test
- two or more positive answers is generally considered a 'positive' result

C	Have you ever felt you should Cut down on your drinking?
A	Have people Annoyed you by criticising your drinking?
G	Have you ever felt bad or Guilty about your drinking?
E	Have you ever had a drink in the morning to get rid of a hangover (Eye opener)?

Diagnosis

ICD-10 definition - 3 or more needed

- compulsion to drink
- difficulties controlling alcohol consumption
- physiological withdrawal

- tolerance to alcohol
- neglect of alternative activities to drinking
- persistent use of alcohol despite evidence of harm



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Next

Which one of the following antibiotics is most likely to cause pseudomembranous colitis?



<input checked="" type="radio"/>	A. Cefaclor
<input type="radio"/>	B. Penicillin V
<input type="radio"/>	C. Erythromycin
<input type="radio"/>	D. Trimethoprim
<input type="radio"/>	E. Doxycycline

Next question

Cephalosporins, not just clindamycin, are strongly linked to *Clostridium difficile*

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea

- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used

Next

Primary sclerosing cholangitis is most associated with:

	<input type="radio"/>	A. Primary biliary cirrhosis
	<input type="radio"/>	B. Crohn's disease
	<input type="radio"/>	C. Hepatitis C infection
	<input type="radio"/>	D. Ulcerative colitis
	<input type="radio"/>	E. Coeliac disease

Next question

Primary sclerosing cholangitis

Primary sclerosing cholangitis is a biliary disease of unknown aetiology characterised by inflammation and fibrosis of intra and extra-hepatic bile ducts

Associations

- ulcerative colitis: 4% of patients with UC have PSC, 80% of patients with PSC have UC
- Crohn's (much less common association than UC)
- HIV

Features

- cholestasis: jaundice and pruritus
- right upper quadrant pain
- fatigue

Investigation

- ERCP is the standard diagnostic tool, showing multiple biliary strictures giving a 'beaded' appearance
- ANCA may be positive
- there is a limited role for liver biopsy, which may show fibrous, obliterative cholangitis often described as 'onion skin'

Complications

- cholangiocarcinoma (in 10%)
- increased risk of colorectal cancer



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Next

Which one of the following patients is most likely to require screening for hepatocellular carcinoma?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. A 45-year-old man with liver cirrhosis secondary to hepatitis C |
| <input type="radio"/> | B. A 33-year-old man with HIV. He is taking antiretroviral therapy |

<input type="radio"/>	C.	A 22-year-old man with alpha-1 antitrypsin deficiency. He has no evidence of current liver disease
<input type="radio"/>	D.	A 52-year-old woman with alcohol-related liver cirrhosis who is still drinking
<input type="radio"/>	E.	A 75-year-old man who drinks 100 units / week. He has no current signs of liver disease

Next question

Patients with liver cirrhosis secondary to hepatitis C have a 3-5% annual incidence of hepatocellular carcinoma.

Hepatocellular carcinoma

Hepatocellular carcinoma (HCC) is the third most common cause of cancer worldwide. Chronic hepatitis B is the most common cause of HCC worldwide with chronic hepatitis C being the most common cause in Europe.

The main risk factor for developing HCC is liver cirrhosis, for example secondary* to hepatitis B & C, alcohol, haemochromatosis and primary biliary cirrhosis. Other risk factors include:

- alpha-1 antitrypsin deficiency
- hereditary tyrosinosis
- glycogen storage disease
- aflatoxin
- drugs: oral contraceptive pill, anabolic steroids
- porphyria cutanea tarda
- male sex
- diabetes mellitus, metabolic syndrome

Features

- tends to present late
- features of liver cirrhosis or failure may be seen: jaundice, ascites, RUQ pain, hepatomegaly, pruritus, splenomegaly
- possible presentation is decompensation in a patient with chronic liver disease

Screening with ultrasound (+/- alpha-fetoprotein) should be considered for high risk groups such as:

- patients liver cirrhosis secondary to hepatitis B & C or haemochromatosis
- men with liver cirrhosis secondary to alcohol

Management options

- early disease: surgical resection
- liver transplantation
- radiofrequency ablation
- transarterial chemoembolisation
- sorafenib: a multikinase inhibitor

*Wilson's disease is an exception



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Next

A 30-year-old man comes for review. He returned from a holiday in Egypt yesterday. For the past two days he has been passing frequent bloody diarrhoea associated with crampy abdominal pain. Abdominal examination demonstrates diffuse lower abdominal tenderness but there is no guarding or rigidity. His temperature is 37.5°C. What is the most likely causative organism?



<input type="radio"/>	A. Giardiasis
<input type="radio"/>	B. Enterotoxigenic <i>Escherichia coli</i>
<input type="radio"/>	C. <i>Staphylococcus aureus</i>
<input type="radio"/>	D. <i>Salmonella</i>
<input checked="" type="radio"/>	E. <i>Shigella</i>



Next question

Enterotoxigenic *Escherichia coli* infections do not usually cause bloody diarrhoea. A differential diagnosis would be amoebic dysentery, enterohemorrhagic *Escherichia coli* and possibly *Campylobacter*.

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one or more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none">• vomiting within 6 hours, stereotypically due to rice• diarrhoeal illness occurring after 6 hours

Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks
-------------------	--

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



Question 54 of 117

Next

Which one of the following statements regarding hepatitis C is correct?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Cannot be transmitted vertically from mother to child |
| <input checked="" type="radio"/> | B. Interferon-alpha and ribavirin are the treatments of choice |
| <input type="radio"/> | C. It is more infectious than hepatitis B following a needle stick injury |
| <input type="radio"/> | D. Breast feeding is contraindicated in mothers with hepatitis C |
| <input type="radio"/> | E. HCV RNA is the initial investigation of choice for at-risk groups |

Next question

Hepatitis C

Hepatitis C is likely to become a significant public health problem in the UK in the next decade. It is thought around 200,000 people are chronically infected with the virus. At risk groups include intravenous drug users and patients who received a blood transfusion prior to 1991 (e.g. haemophiliacs).

Pathophysiology

- hepatitis C is a RNA flavivirus
- incubation period: 6-9 weeks

Transmission

- the risk of transmission during a needle stick injury is about 2%
- the vertical transmission rate from mother to child is about 6%
- breast feeding is not contraindicated in mothers with hepatitis C
- the risk of transmitting the virus during sexual intercourse is probably less than 5%

Features

- after exposure to the hepatitis C virus less than 20% of patients develop an acute hepatitis

Complications

- chronic infection (80-85%) - only 15-20% of patients will clear the virus after an acute infection and hence the majority will develop chronic hepatitis C
- cirrhosis (20-30% of those with chronic disease)
- hepatocellular cancer
- cryoglobulinaemia
- porphyria cutanea tarda (PCT): it is increasingly recognised that PCT may develop in patients with hepatitis C, especially if there are other factors such as alcohol abuse

Management of chronic infection

- currently a combination of pegylated interferon-alpha and ribavirin are used
- up to 55% of patients successfully clear the virus, with success rates of around 80% for some strains
- the aim of treatment is sustained virological response (SVR), defined as undetectable

serum HCV RNA six months after the end of therapy

Complications of treatment

- ribavirin - side-effects: haemolytic anaemia, cough. Women should not become pregnant within 6 months of stopping ribavirin as it is teratogenic
- interferon alpha - side-effects: flu-like symptoms, depression, fatigue, leukopenia, thrombocytopenia



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Next

A 31-year-old woman presents with symptoms consistent with coeliac disease. Which one of the following tests should be used first-line when screening patients for coeliac disease?

- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Anti-casein antibodies |
| <input checked="" type="radio"/> | B. Tissue transglutaminase antibodies |
| <input type="radio"/> | C. Anti-gliadin antibodies |
| <input type="radio"/> | D. Xylose absorption test |
| <input type="radio"/> | E. Anti-endomysial antibodies |

Next question

Coeliac disease - tissue transglutaminase antibodies are the first-line test

Tissue transglutaminase antibodies are recommended as the first-line serological test according to NICE.

Coeliac disease: investigation

Coeliac disease is caused by sensitivity to the protein gluten. Repeated exposure leads to villous atrophy which in turn causes malabsorption. Conditions associated with coeliac disease include dermatitis herpetiformis (a vesicular, pruritic skin eruption) and autoimmune disorders (type 1 diabetes mellitus and autoimmune hepatitis).

Diagnosis is made by a combination of immunology and jejunal biopsy. Villous atrophy and

immunology normally reverses on a gluten-free diet.

NICE issued guidelines on the investigation of coeliac disease in 2009. If patients are already taking a gluten-free diet they should be asked, if possible, to reintroduce gluten for at least 6 weeks prior to testing.

Immunology

- tissue transglutaminase (TTG) antibodies (IgA) are first-choice according to NICE
- endomyseal antibody (IgA)
- anti-gliadin antibody (IgA or IgG) tests are not recommended by NICE
- anti-casein antibodies are also found in some patients

Jejunal biopsy

- villous atrophy
- crypt hyperplasia
- increase in intraepithelial lymphocytes
- lamina propria infiltration with lymphocytes

Rectal gluten challenge has been described but is not widely used

Next

A 22-year-old male blood donor is noted to have the following blood results:

Bilirubin	41 $\mu\text{mol/L}$
ALP	84 U/L
ALT	23 U/L
Albumin	41 g/L
Dipstick urinalysis normal	

He has recently complained of coryzal symptoms and a non-productive cough. What is the most likely diagnosis?



A. Gilbert's syndrome



<input type="radio"/>	B. Dubin-Johnson syndrome
<input type="radio"/>	C. Rotor syndrome
<input type="radio"/>	D. Hepatitis C infection
<input type="radio"/>	E. Infectious mononucleosis

Next question

An isolated hyperbilirubinaemia in a 22-year-old male is likely to be secondary to Gilbert's syndrome. The normal dipstick urinalysis excludes Dubin-Johnson and Rotor syndrome as these both produce a conjugated bilirubinaemia. Viral infections are common triggers for a rise in the bilirubin in patients with Gilbert's

Gilbert's syndrome

Gilbert's syndrome is an autosomal recessive* condition of defective bilirubin conjugation due to a deficiency of UDP glucuronyl transferase. The prevalence is approximately 1-2% in the general population

Features

- unconjugated hyperbilinaemia (i.e. not in urine)
- jaundice may only be seen during an intercurrent illness

Investigation and management

- investigation: rise in bilirubin following prolonged fasting or IV nicotinic acid
- no treatment required



*the exact mode of inheritance is still a matter of debate



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Next

Your next patient is a 34-year-old man who is known to have an alcohol problem. He has drunk around 100 units per week for the past five years. He regularly misses meals and smokes 20 cigarettes per day. What vitamin supplementation, if any, should you recommend?

-  ☐ A. Oral vitamin B compound
-  ☒ B. Oral thiamine
- ☐ C. Oral vitamin B compound + multivitamins
- ☐ D. No supplementation is advised. Give standard dietary advice
- ☐ E. Oral thiamine + vitamin D

Next question

Whilst vitamin B compound is widely prescribed it is not recommended in recent guidelines, for example SIGN.

Alcohol - problem drinking: management

Nutritional support

- SIGN recommends alcoholic patients should receive oral thiamine if their 'diet may be deficient'

Drugs used

- benzodiazepines for acute withdrawal
- disulfiram: promotes abstinence - alcohol intake causes severe reaction due to inhibition of acetaldehyde dehydrogenase. Patients should be aware that even small amounts of alcohol (e.g. In perfumes, foods, mouthwashes) can produce severe symptoms. Contraindications include ischaemic heart disease and psychosis
- acamprosate: reduces craving, known to be a weak antagonist of NMDA receptors, improves abstinence in placebo controlled trials



Question 58 of 117

Next

A 27-year-old female presents with alternating loose and hard stools associated with abdominal discomfort and bloating. Which one of the following is it most important to do before making a positive diagnosis of irritable bowel syndrome?



<input type="radio"/>	A. Arrange ultrasound abdomen
<input type="radio"/>	B. Flexible sigmoidoscopy
<input checked="" type="radio"/>	C. Ask about family history of ovarian cancer
<input type="radio"/>	D. Use a standardised screening tool for depression
<input type="radio"/>	E. Perform thyroid function tests

Next question

Irritable bowel syndrome: diagnosis

NICE published clinical guidelines on the diagnosis and management of irritable bowel syndrome (IBS) in 2008

The diagnosis of IBS should be considered if the patient has had the following for at least 6 months:

- abdominal pain, and/or
- bloating, and/or
- change in bowel habit

A positive diagnosis of IBS should be made if the patient has abdominal pain relieved by defecation or associated with altered bowel frequency stool form, in addition to 2 of the following 4 symptoms:

- altered stool passage (straining, urgency, incomplete evacuation)
- abdominal bloating (more common in women than men), distension, tension or hardness
- symptoms made worse by eating
- passage of mucus

Features such as lethargy, nausea, backache and bladder symptoms may also support the

diagnosis

Red flag features should be enquired about:

- rectal bleeding
- unexplained/unintentional weight loss
- family history of bowel or ovarian cancer
- onset after 60 years of age

Suggested primary care investigations are:

- full blood count
- ESR/CRP
- coeliac disease screen (tissue transglutaminase antibodies)



Question 59 of 117

Next

A 51-year-old woman is investigated for lethargy and pruritus. Her appetite is normal and she has not lost weight. On examination she is not clinically jaundiced and there is no organomegaly. Bloods tests are reported as follows:


Hb	12.8 g/dl
Platelets	$188 \times 10^9/l$
WBC	$6.7 \times 10^9/l$

Na ⁺	140 mmol/l
K ⁺	3.9 mmol/l
Urea	6.2 mmol/l
Creatinine	68 μ mol/l

Bilirubin	30 μ mol/l
ALP	231 u/l

ALT	38 u/l
γGT	367 u/l
Albumin	39 g/l

What further test is most likely to reveal the diagnosis?

- ☐ A. Anti-nuclear antibodies
- ☐ B. Liver ultrasound
-  ☒ C. Anti-mitochondrial antibodies
- ☐ D. Ceruloplasmin
- ☐ E. Ferritin

[Next question](#)

Primary biliary cirrhosis - the **M** rule

- **IgM**
- anti-**M**itochondrial antibodies, **M2** subtype
- **M**iddle aged females

The demographic (middle-aged female), history (lethargy, pruritus) and liver function tests (rise in ALP and γGT) all point to a diagnosis of primary biliary cirrhosis (PBC). Anti-mitochondrial antibodies are found in 98% of patients with PBC.

Primary biliary cirrhosis

Primary biliary cirrhosis is a chronic liver disorder typically seen in middle-aged females (female:male ratio of 9:1). The aetiology is not fully understood although it is thought to be an autoimmune condition. Interlobular bile ducts become damaged by a chronic inflammatory process causing progressive cholestasis which may eventually progress to cirrhosis. The classic presentation is itching in a middle-aged woman

Associations

- Sjogren's syndrome (seen in up to 80% of patients)
- rheumatoid arthritis
- systemic sclerosis
- thyroid disease

Diagnosis

- anti-mitochondrial antibodies (AMA) M2 subtype are present in 98% of patients and are highly specific
- smooth muscle antibodies in 30% of patients
- raised serum IgM

Management

- pruritus: cholestyramine
- fat-soluble vitamin supplementation
- ursodeoxycholic acid
- liver transplantation e.g. if bilirubin > 100 (PBC is a major indication) - recurrence in graft can occur but is not usually a problem



Question 60 of 117

Next

A 27-year-old woman with chronic left iliac fossa pain and alternating bowel habit is diagnosed with irritable bowel syndrome. Initial treatment is tried with a combination of antispasmodics, laxatives and anti-motility agents. Unfortunately after 6 months there has been no significant improvement in her symptoms. According to recent NICE guidelines, what is the most appropriate next step?



- | | |
|----------------------------------|--------------------------------------|
| <input checked="" type="radio"/> | A. Low-dose tricyclic antidepressant |
| <input type="radio"/> | B. Cognitive behavioural therapy |
| <input type="radio"/> | C. Refer for sigmoidoscopy |
| <input type="radio"/> | D. Trial of probiotics |



E. Selective serotonin reuptake inhibitor

[Next question](#)

NICE recommend considering psychological interventions after 12 months. Tricyclic antidepressants should be used in preference to selective serotonin reuptake inhibitors

Irritable bowel syndrome: management

The management of irritable bowel syndrome (IBS) is often difficult and varies considerably between patients. NICE issued guidelines in 2008

First-line pharmacological treatment - according to predominant symptom

- pain: antispasmodic agents
- constipation: laxatives but avoid lactulose
- diarrhoea: loperamide is first-line

Second-line pharmacological treatment

- low-dose tricyclic antidepressants (e.g. amitriptyline 5-10 mg) are used in preference to selective serotonin reuptake inhibitors

Other management options

- psychological interventions - if symptoms do not respond to pharmacological treatments after 12 months and who develop a continuing symptom profile (refractory IBS), consider referring for cognitive behavioural therapy, hypnotherapy or psychological therapy
- complementary and alternative medicines: 'do not encourage use of acupuncture or reflexology for the treatment of IBS'

General dietary advice

- have regular meals and take time to eat
- avoid missing meals or leaving long gaps between eating
- drink at least 8 cups of fluid per day, especially water or other non-caffeinated drinks such as herbal teas
- restrict tea and coffee to 3 cups per day
- reduce intake of alcohol and fizzy drinks

- consider limiting intake of high-fibre food (for example, wholemeal or high-fibre flour and breads, cereals high in bran, and whole grains such as brown rice)
- reduce intake of 'resistant starch' often found in processed foods
- limit fresh fruit to 3 portions per day
- for diarrhoea, avoid sorbitol
- for wind and bloating consider increasing intake of oats (for example, oat-based

breakfast cereal or porridge) and linseeds (up to one tablespoon per day).



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Next

What is the most common extra-intestinal manifestation of Crohn's disease?



<input type="radio"/>	A. Episcleritis
<input type="radio"/>	B. Erythema nodosum
<input checked="" type="radio"/>	C. Arthritis
<input type="radio"/>	D. Uveitis
<input type="radio"/>	E. Clubbing

Next question

Arthritis is the most common extra-intestinal feature in both Crohn's and UC

Crohn's disease

Crohn's disease is a form of inflammatory bowel disease. It commonly affects the terminal ileum and colon but may be seen anywhere from the mouth to anus.

Pathology

- cause is unknown but there is a strong genetic susceptibility

- inflammation occurs in all layers, down to the serosa. This is why patients with Crohn's are prone to strictures, fistulas and adhesions

Crohn's disease typically presents in late adolescence or early adulthood. Features include:

- presentation may be non-specific symptoms such as weight loss and lethargy
- diarrhoea: the most prominent symptom in adults. Crohn's colitis may cause bloody diarrhoea
- abdominal pain: the most prominent symptom in children
- perianal disease: e.g. Skin tags or ulcers
- extra-intestinal features are more common in patients with colitis or perianal disease

Questions regarding the 'extra-intestinal' features of inflammatory bowel disease are common:

	Common to both Crohn's disease (CD) and Ulcerative colitis (UC)	Notes
Related to disease activity	Arthritis: pauciarticular, asymmetric Erythema nodosum Episcleritis Osteoporosis	Arthritis is the most common extra-intestinal feature in both CD and UC Episcleritis is more common in CD
Unrelated to disease activity	Arthritis: polyarticular, symmetric Uveitis Pyoderma gangrenosum Clubbing Primary sclerosing cholangitis	Primary sclerosing cholangitis is much more common in UC Uveitis is more common in UC



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Next

A 29-year-old man is reviewed. Four weeks ago he presented with a one month history of bloody diarrhoea. He was previously fit and well prior to this episode. When initially reviewed he was passing on average four loose stools a day with some visible blood. He was haemodynamically stable with no fever and bloods showed the following:

Hb	15.2 g/dl
----	-----------

Platelets	298 * 10 ⁹ /l
WBC	8.6 * 10 ⁹ /l
CRP	15 mg/l

Colonoscopy showed extensive inflammatory changes consistent with ulcerative colitis. He was started on oral mesalazine and a review appointment was made for today. Unfortunately there has been no significant change in his symptoms. He is still passing around four bloody stools a day although he remains systemically well. What is the most appropriate course of action?

- ✓ ☒ A. Add oral prednisolone
- ☐ B. Stop oral mesalazine and start oral prednisolone
- ☐ C. Rectal corticosteroids
- ☐ D. Admit for intravenous corticosteroids
- ☐ E. Add oral azathioprine

Next question

This patient with mild/moderate ulcerative colitis has not responded to the appropriate first-line therapy of oral aminosalicylates. He should therefore be offered oral prednisolone to help induce remission.

As he remains systemically well there is no need to admit.

Ulcerative colitis: management

Treatment can be divided into inducing and maintaining remission. NICE released guidelines on the management of ulcerative colitis in 2013.

The severity of UC is usually classified as being mild, moderate or severe:

- mild: < 4 stools/day, only a small amount of blood
- moderate: 4-6 stools/day, varying amounts of blood, no systemic upset
- severe: >6 bloody stools per day + features of systemic upset (pyrexia, tachycardia, anaemia, raised inflammatory markers)

Inducing remission

- treatment depends on the extent and severity of disease
- rectal (topical) aminosalicylates or steroids: for distal colitis rectal mesalazine has been shown to be superior to rectal steroids and oral aminosalicylates
- oral aminosalicylates
- oral prednisolone is usually used second-line for patients who fail to respond to aminosalicylates. NICE recommend waiting around 4 weeks before deciding if first-line treatment has failed
- severe colitis should be treated in hospital. Intravenous steroids are usually given first-line

Maintaining remission

- oral aminosalicylates e.g. mesalazine
- azathioprine and mercaptopurine
- methotrexate is not recommended for the management of UC (in contrast to Crohn's disease)
- there is some evidence that probiotics may prevent relapse in patients with mild to moderate disease



Question 63 of 117

Next

Which of the following drugs is least likely to cause cholestasis?

<input type="radio"/>	A. Gliclazide
<input checked="" type="radio"/>	B. Amiodarone
<input type="radio"/>	C. Chlorpromazine
<input type="radio"/>	D. Oral contraceptive pill



E. Co-amoxiclav

[Next question](#)

Drug-induced liver disease

Drug-induced liver disease is generally divided into hepatocellular, cholestatic or mixed. There is however considerable overlap, with some drugs causing a range of changes to the liver

The following drugs tend to cause a hepatocellular picture:

- paracetamol
- sodium valproate, phenytoin
- MAOIs
- halothane
- anti-tuberculosis: isoniazid, rifampicin, pyrazinamide
- statins
- alcohol
- amiodarone
- methyldopa
- nitrofurantoin

The following drugs tend to cause cholestasis (+/- hepatitis):

- oral contraceptive pill
- antibiotics: flucloxacillin, co-amoxiclav, erythromycin*
- anabolic steroids, testosterone
- phenothiazines: chlorpromazine, prochlorperazine
- sulphonylureas
- fibrates
- rare reported causes: nifedipine

Liver cirrhosis

- methotrexate
- methyldopa
- amiodarone

*risk may be reduced with erythromycin stearate



Question 64 of 117

Next

At what age does ulcerative colitis most typically present?



- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. 25-35 years |
| <input type="radio"/> | B. 10-20 years |
| <input type="radio"/> | C. Bimodal: 25-35 years + 55-65 years |
| <input type="radio"/> | D. Bimodal: 15-25 years + 35-45 years |
| <input checked="" type="radio"/> | E. Bimodal: 15-25 years + 55-65 years |



Next question

Ulcerative colitis

Ulcerative colitis (UC) is a form of inflammatory bowel disease. Inflammation always starts at rectum (hence it is the most common site for UC), never spreads beyond ileocaecal valve and is continuous. The peak incidence of ulcerative colitis is in people aged 15-25 years and in those aged 55-65 years.

The initial presentation is usually following insidious and intermittent symptoms. Features include:

- bloody diarrhoea
- urgency
- tenesmus
- abdominal pain, particularly in the left lower quadrant
- extra-intestinal features (see below)

Questions regarding the 'extra-intestinal' features of inflammatory bowel disease are common:

	Common to both Crohn's disease (CD) and Ulcerative colitis (UC)	Notes
Related to disease activity	Arthritis: pauciarticular, asymmetric Erythema nodosum Episcleritis Osteoporosis	Arthritis is the most common extra-intestinal feature in both CD and UC Episcleritis is more common in CD
Unrelated to disease activity	Arthritis: polyarticular, symmetric Uveitis Pyoderma gangrenosum Clubbing Primary sclerosing cholangitis	Primary sclerosing cholangitis is much more common in UC Uveitis is more common in UC

Pathology

- red, raw mucosa, bleeds easily
- no inflammation beyond submucosa (unless fulminant disease)
- widespread ulceration with preservation of adjacent mucosa which has the appearance of polyps ('pseudopolyps')
- inflammatory cell infiltrate in lamina propria
- neutrophils migrate through the walls of glands to form crypt abscesses
- depletion of goblet cells and mucin from gland epithelium
- granulomas are infrequent

Barium enema

- loss of haustrations
- superficial ulceration, 'pseudopolyps'
- long standing disease: colon is narrow and short -'drainpipe colon'



A 54-year-old female presents with a 3 month history of dysphagia affecting both food and liquids from the start, along with symptoms of heartburn. What is the most likely underlying diagnosis?

-  ☐ A. Pharyngeal pouch
- ☐ B. Gastric adenocarcinoma
- ☐ C. Benign stricture
- ☐ D. Oesophageal cancer
-  ☒ E. Achalasia

Next question

Dysphagia affecting both solids and liquids from the start - think achalasia

This is a classic history of achalasia with dysphagia affecting both solids and liquids from the start

Achalasia

Failure of oesophageal peristalsis and of relaxation of lower oesophageal sphincter (LOS) due to degenerative loss of ganglia from Auerbach's plexus i.e. LOS contracted, oesophagus above dilated. Achalasia typically presents in middle-age and is equally common in men and women.

Clinical features

- dysphagia of BOTH liquids and solids
- typically variation in severity of symptoms
- heartburn
- regurgitation of food - may lead to cough, aspiration pneumonia etc
- malignant change in small number of patients

Investigations

- manometry: excessive LOS tone which doesn't relax on swallowing - considered most important diagnostic test
- barium swallow shows grossly expanded oesophagus, fluid level, 'bird's beak' appearance
- CXR: wide mediastinum, fluid level

Treatment

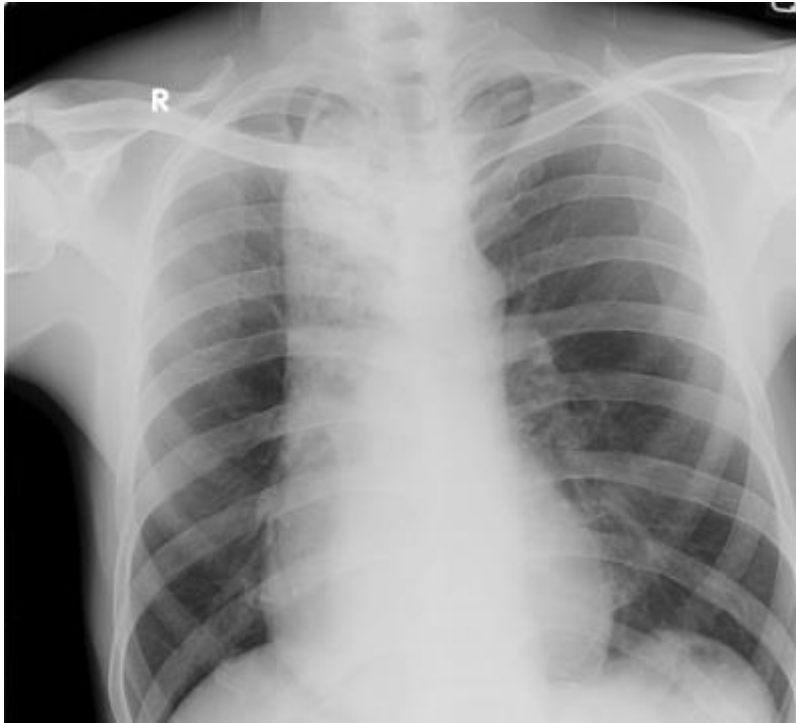
- intra-sphincteric injection of botulinum toxin
- Heller cardiomyotomy
- balloon dilation
- drug therapy has a role but is limited by side-effects



© Image used on license from [Radiopaedia](#)



This film demonstrates the classical 'bird's beak' appearance of the lower oesophagus that is seen in achalasia. An air-fluid level is also seen due to a lack of peristalsis



© Image used on license from [Radiopaedia](#)



Mediastinal widening secondary to achalasia. An air-fluid level can sometimes be seen on CXR but it is not visible on this film



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Barium swallow - grossly dilated filled oesophagus with a tight stricture at the gastroesophageal junction resulting in a 'bird's beak' appearance. Tertiary contractions give rise to a corkscrew appearance of the oesophagus



Question 66 of 117

Next

A 54-year-old female is presents to surgery one week following a cholecystectomy with profuse diarrhoea. What is the most likely diagnosis?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. <i>Campylobacter</i> |
| <input type="radio"/> | B. <i>E. coli</i> |
| <input checked="" type="radio"/> | C. <i>Clostridium difficile</i> |
| <input type="radio"/> | D. <i>Salmonella</i> |



E. *Staphylococcus aureus*

[Next question](#)

Clostridium difficile is the most likely cause as the patient would have been given broad-spectrum antibiotics at the time of the operation

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea
- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



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[Next](#)

A 36-year-old man presents with dyspepsia. No alarm symptoms are present. This is his first episode and he has no significant medical history of note. A test-and-treat strategy is agreed upon. What is the most appropriate investigation to test for *Helicobacter pylori*?

- ☐ A. Gastric aspiration + culture
- ☐ B. CLO test (rapid urease test)
- ☐ C. Stool culture
- ☐ D. Hydrogen breath test
- ☒ E. ¹³C-urea breath test

Next question

The urea breath test is highly sensitive, specific and non-invasive. There is no indication for an endoscopy. Stool antigen, rather than culture, is an alternative.

***Helicobacter pylori*: tests**

Urea breath test

- patients consume a drink containing carbon isotope 13 (¹³C) enriched urea
- urea is broken down by *H. pylori* urease
- after 30 mins patient exhale into a glass tube
- mass spectrometry analysis calculates the amount of ¹³C CO₂
- should not be performed within 4 weeks of treatment with an antibacterial or within 2 weeks of an antiseecretory drug (e.g. a proton pump inhibitor)
- sensitivity 95-98%, specificity 97-98%

Rapid urease test (e.g. CLO test)

- biopsy sample is mixed with urea and pH indicator
- colour change if *H. pylori* urease activity
- sensitivity 90-95%, specificity 95-98%

Serum antibody

- remains positive after eradication

- sensitivity 85%, specificity 80%

Culture of gastric biopsy

- provide information on antibiotic sensitivity
- sensitivity 70%, specificity 100%

Gastric biopsy

- histological evaluation alone, no culture
- sensitivity 95-99%, specificity 95-99%

Stool antigen test

- sensitivity 90%, specificity 95%



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Next

Which one of the following causes of gastroenteritis has the longest incubation period?

<input type="radio"/>	A. <i>Campylobacter</i>
<input type="radio"/>	B. <i>Bacillus cereus</i>
<input type="radio"/>	C. <i>Shigella</i>
<input checked="" type="radio"/>	D. Giardiasis
<input type="radio"/>	E. <i>Salmonella</i>



Next question

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one or more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none">• vomiting within 6 hours, stereotypically due to rice• diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several

Infection	Typical presentation
	weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



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Next

A 52-year-old woman is diagnosed with non-alcoholic steatohepatitis following a liver biopsy. What is the single most important step to help prevent the progression of her disease?



- ☐ A. Stop smoking
- ☐ B. Start statin therapy
- ☐ C. Eat more omega-3 fatty acids
- ☐ D. Start sulfonylurea therapy
- ☒ E. Weight loss



Next question

Non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease (NAFLD) is now the most common cause of liver disease in the developed world. It is largely caused by obesity and describes a spectrum of disease ranging from:

- steatosis - fat in the liver
- steatohepatitis - fat with inflammation, non-alcoholic steatohepatitis (NASH), see below
- progressive disease may cause fibrosis and liver cirrhosis

NAFLD is thought to represent the hepatic manifestation of the metabolic syndrome and hence insulin resistance is thought to be the key mechanism leading to steatosis

Non-alcoholic steatohepatitis (NASH) is a term used to describe liver changes similar to those seen in alcoholic hepatitis in the absence of a history of alcohol abuse. It is relatively common and thought to affect around 3-4% of the general population. The progression of disease in patients with NASH may be responsible for a proportion of patients previously labelled as cryptogenic cirrhosis

Associated factors

- obesity
- hyperlipidaemia
- type 2 diabetes mellitus
- jejunoileal bypass
- sudden weight loss/starvation

Features

- usually asymptomatic
- hepatomegaly
- ALT is typically greater than AST
- increased echogenicity on ultrasound

Management

- the mainstay of treatment is lifestyle changes (particularly weight loss) and monitoring
- there is ongoing research into the role of gastric banding and insulin-sensitising drugs (e.g. Metformin)



You are discussing alcohol intake with a middle-aged man who has just been discharged from hospital after an episode of acute pancreatitis. He currently drinks around 2 litres of cider (ABV 5%) a day. How many units is that a week?

-  ☐ A. 25 units
-  ☒ B. 70 units
- ☐ C. 10 units
- ☐ D. 80 units
- ☐ E. 100 units

[Next question](#)

Alcohol units = volume (ml) * ABV / 1,000

$2000 \text{ ml} \times 5\% = 10,000$

Divide this figure by 1,000 to get the number of units = $10,000 / 1,000 = 10 \text{ units/day}$

$10 \text{ units/day} \times 7 \text{ days} = 70 \text{ units}$

The January 2010 AKT feedback report stated '**Candidates performed poorly in several items related to alcohol. The subject areas included alcohol units, nutrition, treatments for alcohol dependence and complications of alcohol abuse other than liver disease. The NHS Confederation has recently highlighted the increasing burden to the NHS of alcohol related problems and candidates require a broad knowledge of this topic.**'

Alcohol: units

The government currently recommend the following:

- men: should drink no more than 21 units of alcohol per week (and no more than 4 units in any one day)
- women: should drink no more than 14 units of alcohol per week (and no more than 3 units in any one day)

One unit of alcohol is equal to 10 ml of alcohol. The 'strength' of an alcoholic drink is determined by the 'alcohol by volume' (ABV).

Examples of one unit of alcohol:

- 25ml single measure of spirits (ABV 40%)
- a third of a pint of beer (ABV 5 to 6%)
- half a 175ml 'standard' glass of red wine (ABV 12%)

To calculate the number of units in a drink multiply the number of millilitres by the ABV and divide by 1,000. For example:

- half a 175ml 'standard' glass of red wine = $87.5 \times 12 / 1000 = 1.05$ units
- one bottle of wine = $750 \times 12 / 1000 = 9$ units
- one pint of 5% beer or lager = $568 \times 5 / 1000 = 2.8$ units



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Next

You review a 34-year-old man who has had ulcerative colitis for the past 20 years. He describes a one week history of passing three bloody stools per day. Despite this he is eating well and denies abdominal pain. Abdominal examination is unremarkable. What is this episode most likely to represent?



<input type="radio"/>	A. Severe exacerbation of ulcerative colitis
<input type="radio"/>	B. Infective exacerbation of ulcerative colitis
<input checked="" type="radio"/>	C. Mild exacerbation of ulcerative colitis
<input type="radio"/>	D. Moderate exacerbation of ulcerative colitis
<input type="radio"/>	E. Colorectal cancer secondary to longstanding ulcerative colitis

Next question

Ulcerative colitis: flares

Flares of ulcerative colitis are usually classified as either mild, moderate or severe:

Mild	Moderate	Severe
Fewer than four stools daily, with or without blood No systemic disturbance Normal erythrocyte sedimentation rate and C-reactive protein values	Four to six stools a day, with minimal systemic disturbance	More than six stools a day, containing blood Evidence of systemic disturbance, e.g. <ul style="list-style-type: none">• fever• tachycardia• abdominal tenderness, distension or reduced bowel sounds• anaemia• hypoalbuminaemia

Patients with evidence of severe disease should be admitted to hospital.



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Next

A nurse undergoes primary immunisation against hepatitis B. Levels of which one of the following should be checked four months later to ensure an adequate response to immunisation?



- ☒ A. Anti-HBs
- ☐ B. Anti-HBc
- ☐ C. Hepatitis B viral load
- ☐ D. HbeAg
- ☐ E. HBsAg

Next question

It is preferable to achieve anti-HBs levels above 100 mIU/ml, although levels of 10 mIU/ml or more are generally accepted as enough to protect against infection

Hepatitis B serology

Interpreting hepatitis B serology is a dying art form which still occurs at regular intervals in medical exams. It is important to remember a few key facts:

- surface antigen (HBsAg) is the first marker to appear and causes the production of anti-HBs
- HBsAg normally implies acute disease (present for 1-6 months)
- if HBsAg is present for > 6 months then this implies chronic disease (i.e. Infective)
- Anti-HBs implies immunity (either exposure or immunisation). It is negative in chronic disease
- Anti-HBc implies previous (or current) infection. IgM anti-HBc appears during acute or recent hepatitis B infection and is present for about 6 months. IgG anti-HBc persists
- HbeAg results from breakdown of core antigen from infected liver cells as is therefore a marker of infectivity

Example results

- previous immunisation: anti-HBs positive, all others negative
- previous hepatitis B (> 6 months ago), not a carrier: anti-HBc positive, HBsAg negative
- previous hepatitis B, now a carrier: anti-HBc positive, HBsAg positive



Question 73 of 117

Next

Which one of the following extra-intestinal manifestations of inflammatory bowel disease is much more common in ulcerative colitis than in Crohn's disease?



<input type="radio"/>	A. Pauciarticular arthritis
<input type="radio"/>	B. Osteoporosis
<input type="radio"/>	C. Episcleritis
<input type="radio"/>	D. Erythema nodosum



E. Primary sclerosing cholangitis

[Next question](#)

Inflammatory bowel disease: key differences

The two main types of inflammatory bowel disease are Crohn's disease and Ulcerative colitis. They have many similarities in terms of presenting symptoms, investigation findings and management options. There are however some key differences which are highlighted in table below:

	Crohn's disease (CD)	Ulcerative colitis (UC)
Features	Diarrhoea usually non-bloody Weight loss more prominent Upper gastrointestinal symptoms, mouth ulcers, perianal disease Abdominal mass palpable in the right iliac fossa	Bloody diarrhoea more common Abdominal pain in the left lower quadrant Tenesmus
Extra-intestinal	Gallstones are more common secondary to reduced bile acid reabsorption Oxalate renal stones*	Primary sclerosing cholangitis more common
Complications	Obstruction, fistula, colorectal cancer	Risk of colorectal cancer high in UC than CD
Pathology	Lesions may be seen anywhere from the mouth to anus Skip lesions may be present	Inflammation always starts at rectum and never spreads beyond ileocaecal valve Continuous disease
Histology	Inflammation in all layers from mucosa to serosa <ul style="list-style-type: none">• increased goblet cells• granulomas	No inflammation beyond submucosa (unless fulminant disease) - inflammatory cell infiltrate in lamina propria <ul style="list-style-type: none">• neutrophils migrate through the walls of glands to form crypt abscesses• depletion of goblet cells and mucin from gland epithelium• granulomas are infrequent

Endoscopy	Deep ulcers, skip lesions - 'cobble-stone' appearance	Widespread ulceration with preservation of adjacent mucosa which has the appearance of polyps ('pseudopolyps')
Radiology	Small bowel enema <ul style="list-style-type: none"> • high sensitivity and specificity for examination of the terminal ileum • strictures: 'Kantor's string sign' • proximal bowel dilation • 'rose thorn' ulcers • fistulae 	Barium enema <ul style="list-style-type: none"> • loss of haustrations • superficial ulceration, 'pseudopolyps' • long standing disease: colon is narrow and short - 'drainpipe colon'

*impaired bile acid reabsorption increases the loss calcium in the bile. Calcium normally binds oxalate.



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Next

You are reviewing a 33-year-old man who was diagnosed with coeliac disease two years ago. He complains of ongoing diarrhoea, feeling tired and bloating. You suspect poor compliance with a gluten-free diet but he reports being 'very consistent'. Which one of the following is the most appropriate method to ascertain this



- ☐ A. Food diary
- ☒ B. Tissue transglutaminase antibodies
- ☐ C. Faecal calprotectin measurement
- ☐ D. Refer for a duodenal biopsy
- ☐ E. Anti-endomysial antibodies

Next question

A food diary is unlikely to be useful if the patient already reports following a gluten free diet.

It is of course important to consider referring such patients if they are shown to have good compliance. Complications such as small bowel lymphoma may need to be excluded.

Coeliac disease: management

The management of coeliac disease involves a gluten-free diet. Gluten containing cereals include:

- wheat: bread, pasta, pastry
- barley*: beer
- rye
- oats**

Some notable foods which are gluten-free include:

- rice
- potatoes
- corn (maize)

Tissue transglutaminase antibodies may be checked to check compliance with a gluten free diet.

*whisky is made using malted barley. Proteins such as gluten are however removed during the distillation process making it safe to drink for patients with coeliac disease

**some patients with coeliac disease appear able to tolerate oats



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Next

A baby is born to a mother who is known to have chronic hepatitis B. The mothers latest results are as follows:

HBsAg	Positive
HBeAg	Positive

What is the most appropriate strategy for reducing the vertical transmission rate?



- ☒ A. Give the newborn hepatitis B vaccine + hepatitis B immunoglobulin
- ☐ B. Give the newborn hepatitis B vaccine

<input type="radio"/>	C.	Give the newborn hepatitis B immunoglobulin
<input type="radio"/>	D.	Give the mother intravenous zidovudine during labour
<input type="radio"/>	E.	Give the mother hepatitis B immunoglobulin shortly before birth + the newborn hepatitis B vaccine

Next question

HBeAg is a marker of infectivity. The Green Book guidelines advise giving both the vaccine and immunoglobulin in this situation. If the patient had antibodies against HBe (anti-HBe), rather than the HBe antigen as in this scenario, then only the vaccine would need to be given. Please see the link for more details.

Hepatitis B and pregnancy

Basics

- all pregnant women are offered screening for hepatitis B
- babies born to mothers who are chronically infected with hepatitis B or to mothers who've had acute hepatitis B during pregnancy should receive a complete course of vaccination + hepatitis B immunoglobulin
- studies are currently evaluating the role of oral antiviral treatment (e.g. Lamivudine) in the latter part of pregnancy
- there is little evidence to suggest caesarean section reduces vertical transmission rates
- hepatitis B cannot be transmitted via breastfeeding (in contrast to HIV)



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Next

Which one of the following statements best describes the prevention and treatment of hepatitis C?



<input type="radio"/>	A.	No vaccine is available and treatment is only successful in around 10-15% of patients
<input type="radio"/>	B.	No vaccine and no treatment is available
<input type="radio"/>	C.	A vaccine is available and treatment is successful in around 50% of patients



D. A vaccine is available but no treatment has been shown to be effective



E. No vaccine is available but treatment is successful in around 50% of patients

Next question

Hepatitis C

Hepatitis C is likely to become a significant public health problem in the UK in the next decade. It is thought around 200,000 people are chronically infected with the virus. At risk groups include intravenous drug users and patients who received a blood transfusion prior to 1991 (e.g. haemophiliacs).

Pathophysiology

- hepatitis C is a RNA flavivirus
- incubation period: 6-9 weeks

Transmission

- the risk of transmission during a needle stick injury is about 2%
- the vertical transmission rate from mother to child is about 6%
- breast feeding is not contraindicated in mothers with hepatitis C
- the risk of transmitting the virus during sexual intercourse is probably less than 5%

Features

- after exposure to the hepatitis C virus less than 20% of patients develop an acute hepatitis

Complications

- chronic infection (80-85%) - only 15-20% of patients will clear the virus after an acute infection and hence the majority will develop chronic hepatitis C
- cirrhosis (20-30% of those with chronic disease)
- hepatocellular cancer
- cryoglobulinaemia

- porphyria cutanea tarda (PCT): it is increasingly recognised that PCT may develop in patients with hepatitis C, especially if there are other factors such as alcohol abuse

Management of chronic infection

- currently a combination of pegylated interferon-alpha and ribavirin are used
- up to 55% of patients successfully clear the virus, with success rates of around 80% for some strains
- the aim of treatment is sustained virological response (SVR), defined as undetectable

serum HCV RNA six months after the end of therapy

Complications of treatment

- ribavirin - side-effects: haemolytic anaemia, cough. Women should not become pregnant within 6 months of stopping ribavirin as it is teratogenic
- interferon alpha - side-effects: flu-like symptoms, depression, fatigue, leukopenia, thrombocytopenia



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Next

A 23-year-old female with a history of diarrhoea and weight loss has a colonoscopy to investigate her symptoms. A biopsy is taken and reported as follows:

Pigment laden macrophages suggestive of melanosis coli

What is the most likely diagnosis?



<input type="radio"/>	A. Intestinal melanoma
<input type="radio"/>	B. Haemochromatosis
<input type="radio"/>	C. Ulcerative colitis
<input checked="" type="radio"/>	D. Laxative abuse



E. Colorectal cancer

Next question

Melanosis coli

Melanosis coli is a disorder of pigmentation of the bowel wall. Histology demonstrates pigment-laden macrophages

It is associated with laxative abuse, especially anthraquinone compounds such as senna



Question 78 of 117

Next

A 36-year-old former intravenous drug user is to commence treatment for hepatitis C with interferon-alpha and ribavirin. Which of the following adverse effects are most likely to occur when patients are treated with interferon-alpha?



- ☐ A. Diarrhoea and transient rise in ALT
- ☐ B. Cough and haemolytic anaemia
- ☐ C. Flu-like symptoms and transient rise in ALT
- ☐ D. Haemolytic anaemia and flu-like symptoms
- ☒ E. Depression and flu-like symptoms

Next question

Interferon

Interferons (IFN) are cytokines released by the body in response to viral infections and neoplasia. They are classified according to cellular origin and the type of receptor they bind to. IFN-alpha and IFN-beta bind to type 1 receptors whilst IFN-gamma binds only to type 2 receptors.

IFN-alpha

- produced by leucocytes
- antiviral action
- useful in hepatitis B & C, Kaposi's sarcoma, metastatic renal cell cancer, hairy cell leukaemia
- adverse effects include flu-like symptoms and depression

IFN-beta

- produced by fibroblasts
- antiviral action
- reduces the frequency of exacerbations in patients with relapsing-remitting MS

IFN-gamma

- produced by T lymphocytes & NK cells
- weaker antiviral action, more of a role in immunomodulation particularly macrophage activation
- may be useful in chronic granulomatous disease and osteopetrosis



Question 79 of 117

Next

A 29-year-old woman develops severe vomiting four hours after having lunch at a local restaurant. What is the most likely causative organism?

<input type="radio"/>	A. <i>Escherichia coli</i>
<input type="radio"/>	B. <i>Shigella</i>
<input type="radio"/>	C. <i>Campylobacter</i>
<input type="radio"/>	D. <i>Salmonella</i>



E. *Staphylococcus aureus*

[Next question](#)

The short incubation period and severe vomiting point to a diagnosis of *Staphylococcus aureus* food poisoning.

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody

	Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours

0 / 3 **Question 80-82 of 117**

Next

Theme: Hepatobiliary disease and related disorders

A.	Ascending cholangitis
B.	Acute cholecystitis
C.	Biliary colic
D.	Amoebic liver abscess
E.	Pancreatic cancer
F.	Viral hepatitis
G.	Gastric ulcer
H.	Cholangiocarcinoma
I.	Duodenal ulcer

J. Acute pancreatitis

For each of the following scenarios please select the most likely diagnosis:

80. A 56-year-old woman who is known to have gallstones presents with severe epigastric pain and vomiting. On examination she is afebrile and tender in the epigastrium.

 You answered Ascending cholangitis

The correct answer is Acute pancreatitis

Gallstones and alcohol are the two most common causes of acute pancreatitis. The site of pain and absence of fever point away from a diagnosis of acute cholecystitis.

81. A 63-year-old man presents with weight loss and anorexia. He denies any abdominal pain but says his stools have become pale and difficult to flush away. On examination he is noticed to have jaundiced sclera.

 You answered Ascending cholangitis

The correct answer is Pancreatic cancer

Whilst painless jaundice is the classical presentation of pancreatic cancer most studies suggest pain is a relatively common presenting symptom.

82. An overweight 47-year-old woman presents with recurrent episodes of pain in the right upper quadrant which is brought on by eating fatty food.

 You answered Ascending cholangitis

The correct answer is Biliary colic

Patients with gallstones are stereotypically fat, female and in their forties.

[Next question](#)

The table below gives characteristic exam question features for conditions causing hepatobiliary disease and related disorders:

Viral hepatitis	<p>Common symptoms include:</p> <ul style="list-style-type: none"> • nausea and vomiting, anorexia • myalgia • lethargy • right upper quadrant (RUQ) pain <p>Questions may point to risk factors such as foreign travel or intravenous drug use.</p>
Congestive hepatomegaly	<p>The liver only usually causes pain if stretched. One common way this can occur is as a consequence of congestive heart failure. In severe cases cirrhosis may occur.</p>
Biliary colic	<p>RUQ pain, intermittent, usually begins abruptly and subsides gradually. Attacks often occur after eating. Nausea is common.</p> <p>It is sometimes taught that patients are female, forties, fat and fair although this is obviously a generalisation.</p>
Acute cholecystitis	<p>Pain similar to biliary colic but more severe and persistent. The pain may radiate to the back or right shoulder.</p> <p>The patient may be pyrexial and Murphy's sign positive (arrest of inspiration on palpation of the RUQ)</p>
Ascending cholangitis	<p>An infection of the bile ducts commonly secondary to gallstones. Classically presents with a triad of:</p> <ul style="list-style-type: none"> • fever (rigors are common) • RUQ pain • jaundice
Gallstone ileus	<p>This describes small bowel obstruction secondary to an impacted gallstone. It may develop if a fistula forms between a gangrenous gallbladder and the duodenum.</p> <p>Abdominal pain, distension and vomiting are seen.</p>
Cholangiocarcinoma	<p>Persistent biliary colic symptoms, associated with anorexia, jaundice and weight loss. A palpable mass in the right upper quadrant (Courvoisier sign), periumbilical lymphadenopathy (Sister Mary Joseph nodes) and left supraclavicular adenopathy (Virchow node) may be seen</p>

Acute pancreatitis	Usually due to alcohol or gallstones Severe epigastric pain Vomiting is common Examination may reveal tenderness, ileus and low-grade fever Periumbilical discolouration (Cullen's sign) and flank discolouration (Grey-Turner's sign) is described but rare
Pancreatic cancer	Painless jaundice is the classical presentation of pancreatic cancer. However pain is actually a relatively common presenting symptom of pancreatic cancer. Anorexia and weight loss are common
Amoebic liver abscess	Typical symptoms are malaise, anorexia and weight loss. The associated RUQ pain tends to be mild and jaundice is uncommon.



Question 83 of 117

Next

How many units of alcohol are in a 750ml bottle of red wine with an alcohol by volume of 12%?

- ☐ A. 6 units
- ☒ B. 7 units
- ☐ C. 8 units
- ☒ D. 9 units
- ☐ E. 10 units

Next question

Alcohol units = volume (ml) * ABV / 1,000

The January 2010 AKT feedback report stated '**Candidates performed poorly in several items related to alcohol. The subject areas included alcohol units, nutrition, treatments for alcohol dependence and complications of alcohol abuse other than liver disease. The NHS**

Confederation has recently highlighted the increasing burden to the NHS of alcohol related problems and candidates require a broad knowledge of this topic. '

Alcohol: units

The government currently recommend the following:

- men: should drink no more than 21 units of alcohol per week (and no more than 4 units in any one day)
- women: should drink no more than 14 units of alcohol per week (and no more than 3 units in any one day)

One unit of alcohol is equal to 10 ml of alcohol. The 'strength' of an alcoholic drink is determined by the 'alcohol by volume' (ABV).

Examples of one unit of alcohol:

- 25ml single measure of spirits (ABV 40%)
- a third of a pint of beer (ABV 5 to 6%)
- half a 175ml 'standard' glass of red wine (ABV 12%)

To calculate the number of units in a drink multiply the number of millilitres by the ABV and divide by 1,000. For example:

- half a 175ml 'standard' glass of red wine = $87.5 \times 12 / 1000 = 1.05$ units
- one bottle of wine = $750 \times 12 / 1000 = 9$ units
- one pint of 5% beer or lager = $568 \times 5 / 1000 = 2.8$ units



Question 84 of 117

Next

Which one of the following is not associated with oesophageal cancer?



- | | |
|-----------------------|--------------|
| <input type="radio"/> | A. Achalasia |
| <input type="radio"/> | B. Smoking |

- | | |
|------------------------------------|--------------------------------------|
| <input type="radio"/> | C. Gastro-oesophageal reflux disease |
| ✓ <input checked="" type="radio"/> | D. <i>Helicobacter pylori</i> |
| <input type="radio"/> | E. Alcohol |

[Next question](#)

Helicobacter pylori may actually be protective against oesophageal cancer.

Oesophageal cancer

Until recent times oesophageal cancer was most commonly due to a squamous cell carcinoma but the incidence of adenocarcinoma is rising rapidly. Adenocarcinoma is now the most common type of oesophageal cancer and is more likely to develop in patients with a history of gastro-oesophageal reflux disease (GORD) or Barrett's.

The majority of tumours are in the middle third of the oesophagus.

Risk factors

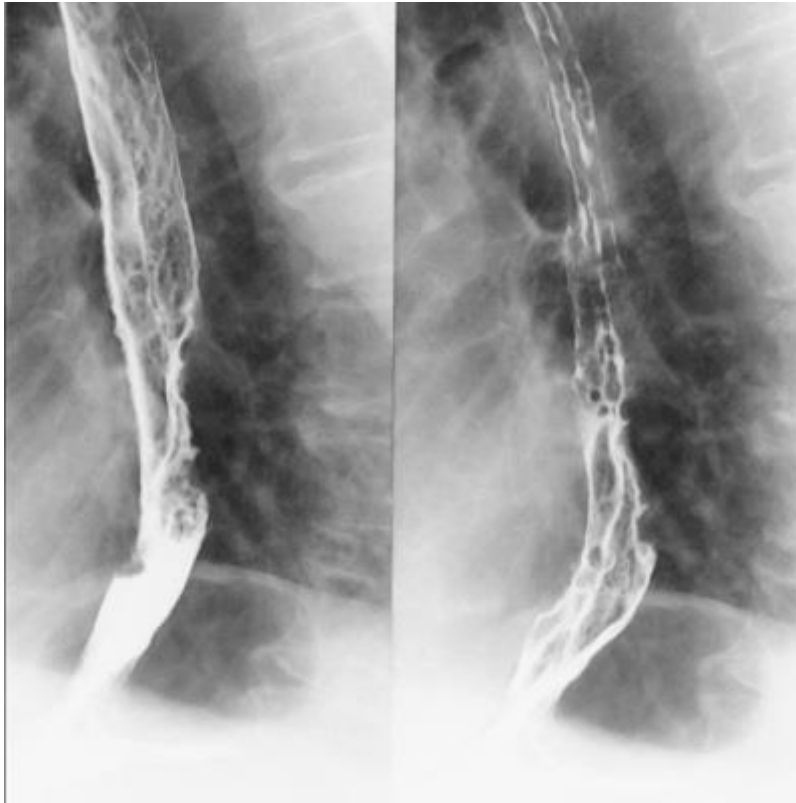
- smoking
- alcohol
- GORD
- Barrett's oesophagus
- achalasia
- Plummer-Vinson syndrome
- rare: coeliac disease, scleroderma



© Image used on license from [Radiopaedia](#)



Barium swallow - 5cm irregular narrowing of the mid-thoracic oesophagus with proximal shouldering



© Image used on license from [Radiopaedia](#)



Fluoroscopy - a region of fixed, irregular stricturing is seen in the distal oesophagus



Question 85 of 117

Next

A patient presents with gastrointestinal symptoms. Which one of the following features in the history would be least consistent with making a diagnosis of irritable bowel syndrome?



- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Urgency to open bowels |
| <input type="radio"/> | B. Symptoms made worse by eating |
| <input checked="" type="radio"/> | C. 62-year-old female |
| <input type="radio"/> | D. Passage of mucous with stool |



E. Bladder symptoms

[Next question](#)

Onset after 60 years of age is considered a red flag in the new NICE guidelines.

Irritable bowel syndrome: diagnosis

NICE published clinical guidelines on the diagnosis and management of irritable bowel syndrome (IBS) in 2008

The diagnosis of IBS should be considered if the patient has had the following for at least 6 months:

- abdominal pain, and/or
- bloating, and/or
- change in bowel habit

A positive diagnosis of IBS should be made if the patient has abdominal pain relieved by defecation or associated with altered bowel frequency stool form, in addition to 2 of the following 4 symptoms:

- altered stool passage (straining, urgency, incomplete evacuation)
- abdominal bloating (more common in women than men), distension, tension or hardness
- symptoms made worse by eating
- passage of mucus

Features such as lethargy, nausea, backache and bladder symptoms may also support the diagnosis

Red flag features should be enquired about:

- rectal bleeding
- unexplained/unintentional weight loss
- family history of bowel or ovarian cancer
- onset after 60 years of age

Suggested primary care investigations are:

- full blood count
- ESR/CRP

- coeliac disease screen (tissue transglutaminase antibodies)



Question 86 of 117

Next

A 38-year-old woman is noticed to be jaundiced. As part of a liver screen the following results are obtained:

Anti-HBs	Negative
Anti-HBc	Positive
HBs antigen	Positive
IgM anti-HBc	Negative

Anti-HBs = Hepatitis B Surface Antibody; Anti-HBc = Hepatitis B Core Antibody; HBs antigen = Hepatitis B Surface Antigen

What is the patient's hepatitis B status?



- ☐ A. Probable hepatitis D infection
- ☐ B. Acute hepatitis B infection
- ☐ C. Previous immunisation to hepatitis B
- ☒ D. Chronic hepatitis B
- ☐ E. Previous hepatitis B infection, not a carrier

Next question

The negative IgM anti-HBc points to a chronic rather than acute infection.

Hepatitis B serology

Interpreting hepatitis B serology is a dying art form which still occurs at regular intervals in medical exams. It is important to remember a few key facts:

- surface antigen (HBsAg) is the first marker to appear and causes the production of anti-HBs

- HBsAg normally implies acute disease (present for 1-6 months)
- if HBsAg is present for > 6 months then this implies chronic disease (i.e. Infective)
- Anti-HBs implies immunity (either exposure or immunisation). It is negative in chronic disease
- Anti-HBc implies previous (or current) infection. IgM anti-HBc appears during acute or recent hepatitis B infection and is present for about 6 months. IgG anti-HBc persists
- HbeAg results from breakdown of core antigen from infected liver cells as is therefore a marker of infectivity

Example results

- previous immunisation: anti-HBs positive, all others negative
- previous hepatitis B (> 6 months ago), not a carrier: anti-HBc positive, HBsAg negative
- previous hepatitis B, now a carrier: anti-HBc positive, HBsAg positive

0 / 3 **Question 87-89 of 117**

Next

Theme: Diarrhoea

A.	Gastroenteritis
B.	Crohn's disease
C.	Ulcerative colitis
D.	Colorectal cancer
E.	Laxative abuse
F.	Constipation causing overflow
G.	Lactose intolerance
H.	Diverticulitis
I.	Irritable bowel syndrome
J.	Coeliac disease

For each one of the following scenarios please select the most likely diagnosis:

87. A 41-year-old man with cerebral palsy is admitted with abdominal pain and diarrhoea. His carers report him passing 5-6 watery stools per day for the past four days. On examination he has a mass in the left side of the abdomen.

 You answered Gastroenteritis

The correct answer is Constipation causing overflow

88. A 37-year-old woman presents with a three week history of diarrhoea and crampy abdominal pains. On examination she is noted to have a number of perianal skin tags.

 You answered Gastroenteritis

The correct answer is Crohn's disease

89. A 4-year-old boy is investigated for chronic diarrhoea, abdominal bloating and failure to thrive.

 You answered Gastroenteritis

The correct answer is Coeliac disease

These are typical presenting features of coeliac disease in children.

[Next question](#)

Diarrhoea

The table below gives characteristic features for conditions causing diarrhoea:

Usually acute

Gastroenteritis	May be accompanied by abdominal pain or nausea/vomiting
Diverticulitis	Classically causes left lower quadrant pain, diarrhoea and fever
Antibiotic therapy	More common with broad spectrum antibiotics

	<i>Clostridium difficile</i> is also seen with antibiotic use
Constipation causing overflow	A history of alternating diarrhoea and constipation may be given May lead to faecal incontinence in the elderly

Usually chronic

Irritable bowel syndrome	Extremely common. The most consistent features are abdominal pain, bloating and change in bowel habit. Patients may be divided into those with diarrhoea predominant IBS and those with constipation predominant IBS. Features such as lethargy, nausea, backache and bladder symptoms may also be present
Ulcerative colitis	Bloody diarrhoea may be seen. Crampy abdominal pain and weight loss are also common. Faecal urgency and tenesmus may be seen
Crohn's disease	Crampy abdominal pains and diarrhoea. Bloody diarrhoea less common than in ulcerative colitis. Other features include malabsorption, mouth ulcers perianal disease and intestinal obstruction
Colorectal cancer	Symptoms depend on the site of the lesion but include diarrhoea, rectal bleeding, anaemia and constitutional symptoms e.g. Weight loss and anorexia
Coeliac disease	In children may present with failure to thrive, diarrhoea and abdominal distension In adults lethargy, anaemia, diarrhoea and weight loss are seen. Other autoimmune conditions may coexist

Other conditions associated with diarrhoea include:

- thyrotoxicosis
- laxative abuse
- appendicitis



Which one of the following statements regarding malnutrition is correct?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. MUST gives a score out of 10 |
| <input type="radio"/> | B. An alternative screening tool to MUST should be used for Asian patients |
| <input type="radio"/> | C. It is not designed to be used in the community |
| <input type="radio"/> | D. MUST includes questions about a patients activity levels |
| <input checked="" type="radio"/> | E. Around 10% of patients aged over 65 years are malnourished |

Next question

Malnutrition

Malnutrition is an important consequence of and contributor to chronic disease. It is clearly a complex and multifactorial problem that can be difficult to manage but there are a number of key points to remember for the exam.

NICE define malnutrition as the following:

- a Body Mass Index (BMI) of less than 18.5; or
- unintentional weight loss greater than 10% within the last 3-6 months; or
- a BMI of less than 20 and unintentional weight loss greater than 5% within the last 3-6 months

Around 10% of patients aged over 65 years are malnourished, the vast majority of those living independently, i.e. not in hospital or care/nursing homes.

Screening for malnutrition is mostly done using MUST (Malnutrition Universal Screen Tool). A link is provided to a copy of the MUST score algorithm.

- it should be done on admission to care/nursing homes and hospital, or if there is concern. For example an elderly, thin patient with pressure sores
- it takes into account BMI, recent weight change and the presence of acute disease
- categorises patients into low, medium and high risk

Management of malnutrition is difficult. NICE recommend the following points:

- dietician support if the patient is high-risk
- a 'food-first' approach with clear instructions (e.g. 'add full-fat cream to mashed potato'), rather than just prescribing oral nutritional supplements (ONS) such as Ensure
- if ONS are used they should be taken between meals, rather than instead of meals



Question 91 of 117

Next

Which one of the following patients would it be most suitable to offer a screening test for coeliac disease to?



<input checked="" type="radio"/>	A. A patient who is 'tired all the time'
<input type="radio"/>	B. A patient with rheumatoid arthritis
<input type="radio"/>	C. A patient who has a family history of inflammatory bowel disease
<input type="radio"/>	D. A patient with type 2 diabetes mellitus
<input type="radio"/>	E. A patient who develops erythema nodosum

Next question

Coeliac disease

Coeliac disease is caused by sensitivity to the protein gluten. Repeated exposure leads to villous atrophy which in turn causes malabsorption. Conditions associated with coeliac disease include dermatitis herpetiformis (a vesicular, pruritic skin eruption) and autoimmune disorders (type 1 diabetes mellitus and autoimmune hepatitis). It is strongly associated with HLA-DQ2 (95% of patients) and HLA-B8 (80%) as well as HLA-DR3 and HLA-DR7

In 2009 NICE issued guidelines on the investigation of coeliac disease. They suggest that the following patients should be screened for coeliac disease:

Signs and symptoms	Conditions
<ul style="list-style-type: none"> • Chronic or intermittent diarrhoea • Failure to thrive or faltering growth (in children) • Persistent or unexplained gastrointestinal symptoms including nausea and vomiting • Prolonged fatigue ('tired all the time') • Recurrent abdominal pain, cramping or distension • Sudden or unexpected weight loss • Unexplained iron-deficiency anaemia, or other unspecified anaemia 	<ul style="list-style-type: none"> • Autoimmune thyroid disease • Dermatitis herpetiformis • Irritable bowel syndrome • Type 1 diabetes • First-degree relatives (parents, siblings or children) with coeliac disease

Complications

- anaemia: iron, folate and vitamin B12 deficiency (folate deficiency is more common than vitamin B12 deficiency in coeliac disease)
- hyposplenism
- osteoporosis, osteomalacia
- lactose intolerance
- enteropathy-associated T-cell lymphoma of small intestine
- subfertility, unfavourable pregnancy outcomes
- rare: oesophageal cancer, other malignancies



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Next

Which of the following is not known to cause acute pancreatitis?



- | | |
|----------------------------------|--------------------------|
| <input checked="" type="radio"/> | A. Hypocalcaemia |
| <input type="radio"/> | B. Hypothermia |
| <input type="radio"/> | C. Mumps |
| <input type="radio"/> | D. Hypertriglyceridaemia |
| <input type="radio"/> | E. Steroids |

Next question

Hypercalcaemia, not hypocalcaemia is a recognised cause of acute pancreatitis

Acute pancreatitis: causes

The vast majority of cases in the UK are caused by gallstones and alcohol

Popular mnemonic is **GET SMASHED**

- **G**allstones
- **E**thanol
- **T**rauma
- **S**teroids
- **M**umps (other viruses include Coxsackie B)
- **A**utoimmune (e.g. polyarteritis nodosa), **A**scaris infection
- **S**corpion venom
- **H**ypertriglyceridaemia, **H**yperchylomicronaemia, **H**ypercalcaemia, **H**ypothermia
- **E**RCP
- **D**rugs (azathioprine, mesalazine*, didanosine, bendroflumethiazide, furosemide, pentamidine, steroids, sodium valproate)

*pancreatitis is 7 times more common in patients taking mesalazine than sulfasalazine



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Next

Which one of the following regarding the AUDIT questionnaire for alcohol misuse is correct?



<input type="radio"/>	A. A score of 12 in a man is likely to indicate a low risk of alcohol misuse
<input checked="" type="radio"/>	B. Consists of 10 items
<input type="radio"/>	C. Asks about thoughts of self harm
<input type="radio"/>	D. Maximum score is 30
<input type="radio"/>	E. Is less sensitive than the CAGE questionnaire

Next question

Alcohol - problem drinking: detection and assessment

Screening

AUDIT

- 10 item questionnaire, please see the link
- takes about 2-3 minutes to complete
- has been shown to be superior to CAGE and biochemical markers for predicting alcohol problems
- minimum score = 0, maximum score = 40
- a score of 8 or more in men, and 7 or more in women, indicates a strong likelihood of hazardous or harmful alcohol consumption
- a score of 15 or more in men, and 13 or more in women, is likely to indicate alcohol dependence
- AUDIT-C is an abbreviated form consisting of 3 questions

FAST

- 4 item questionnaire
- minimum score = 0, maximum score = 16
- the score for hazardous drinking is 3 or more
- with relation to the first question 1 drink = 1/2 pint of beer or 1 glass of wine or 1 single spirits
- if the answer to the first question is 'never' then the patient is not misusing alcohol
- if the response to the first question is 'Weekly' or 'Daily or almost daily' then the patient is a hazardous, harmful or dependent drinker. Over 50% of people will be classified using just this one question

1	MEN: How often do you have EIGHT or more drinks on one occasion? WOMEN: How often do you have SIX or more drinks on one occasion?
2	How often during the last year have you been unable to remember what happened the night before because you had been drinking?
3	How often during the last year have you failed to do what was normally expected of you because of drinking?

4	In the last year has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?
----------	---

CAGE

- well known but recent research has questioned it's value as a screening test
- two or more positive answers is generally considered a 'positive' result

C	Have you ever felt you should C ut down on your drinking?
A	Have people A nnoyed you by criticising your drinking?
G	Have you ever felt bad or G uilty about your drinking?
E	Have you ever had a drink in the morning to get rid of a hangover (E ye opener)?

Diagnosis

ICD-10 definition - 3 or more needed

- compulsion to drink
- difficulties controlling alcohol consumption
- physiological withdrawal
- tolerance to alcohol
- neglect of alternative activities to drinking
- persistent use of alcohol despite evidence of harm



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[Next](#)

A 62-year-old woman with a history of scleroderma is reviewed. For the past few months she has suffered with recurrent bouts of diarrhoea. During these bouts her stools are pale, bulky and offensive. She drinks 14 units of alcohol/week. Bloods show the following:

Hb	10.8 g/dl
Platelets	231 * 10 ⁹ /l
WBC	5.4 * 10 ⁹ /l
Ferritin	14 ng/ml
Vitamin B12	170 ng/l
Folate	2.2 nmol/l

Na ⁺	142 mmol/l
K ⁺	3.4 mmol/l
Urea	4.5 mmol/l
Creatinine	77 μ mol/l

Bilirubin	21 μ mol/l
ALP	88 u/l
ALT	21 u/l
γ GT	55 u/l
Albumin	36 g/l

Which one of the following complications is most likely to have occurred?

- ☐ A. Whipple's disease
- ☐ B. Colonic hypomotility
- ☐ C. Chronic pancreatitis
- ☒ D. Malabsorption syndrome
- ☐ E. Ileal stenosis

Next question

Malabsorption syndrome is a very common complication of scleroderma (systemic sclerosis). The

bloods show evidence of impaired absorption of some vitamins (B12, folate), nutrients (iron) and protein (low albumin).

Malabsorption

Malabsorption is characterised by diarrhoea, steatorrhoea and weight loss. Causes may be broadly divided into intestinal (e.g. villous atrophy), pancreatic (deficiency of pancreatic enzyme production or secretion) and biliary (deficiency of bile-salts needed for emulsification of fats)

Intestinal causes of malabsorption

- coeliac disease
- Crohn's disease
- tropical sprue
- Whipple's disease
- Giardiasis
- brush border enzyme deficiencies (e.g. lactase insufficiency)

Pancreatic causes of malabsorption

- chronic pancreatitis
- cystic fibrosis
- pancreatic cancer

Biliary causes of malabsorption

- biliary obstruction
- primary biliary cirrhosis

Other causes

- bacterial overgrowth (e.g. systemic sclerosis, diverticulae, blind loop)
- short bowel syndrome
- lymphoma



Question 95 of 117

Next

A 29-year-old man presents with a 12 day history of watery diarrhoea that developed one week after returning from India. He had travelled around northern India for two months. On examination he is afebrile and his abdomen is soft and non-tender. What is the most likely causative organism?



- ☐ A. Amoebiasis
- ☒ B. Giardiasis
- ☐ C. *Campylobacter*
- ☐ D. *Shigella*
- ☐ E. *Salmonella*

Next question

The incubation period and prolonged, non-bloody diarrhoea point towards giardiasis

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one or more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea

Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks



Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



A patient who was an intravenous drug user in the 1990s asks for a hepatitis C test. What is the most appropriate action?

- | | | |
|---|----------------------------------|--|
|  | <input type="radio"/> | A. Refer him for pre-test counselling to discuss the pros and cons of testing |
| | <input type="radio"/> | B. Advise him that no accurate test is currently available but that he should undertake normal precautions |
|  | <input checked="" type="radio"/> | C. Arrange an anti-HCV antibody test |
| | <input type="radio"/> | D. Arrange a HCV RNA test |
| | <input type="radio"/> | E. Refer him to gastroenterology for a liver biopsy |

Next question

HCV RNA tests are normally only ordered following a positive antibody test.

Hepatitis C

Hepatitis C is likely to become a significant public health problem in the UK in the next decade. It is thought around 200,000 people are chronically infected with the virus. At risk groups include intravenous drug users and patients who received a blood transfusion prior to 1991 (e.g. haemophiliacs).

Pathophysiology

- hepatitis C is a RNA flavivirus
- incubation period: 6-9 weeks

Transmission

- the risk of transmission during a needle stick injury is about 2%
- the vertical transmission rate from mother to child is about 6%
- breast feeding is not contraindicated in mothers with hepatitis C
- the risk of transmitting the virus during sexual intercourse is probably less than 5%

Features

- after exposure to the hepatitis C virus less than 20% of patients develop an acute hepatitis

Complications

- chronic infection (80-85%) - only 15-20% of patients will clear the virus after an acute infection and hence the majority will develop chronic hepatitis C
- cirrhosis (20-30% of those with chronic disease)
- hepatocellular cancer
- cryoglobulinaemia
- porphyria cutanea tarda (PCT): it is increasingly recognised that PCT may develop in patients with hepatitis C, especially if there are other factors such as alcohol abuse

Management of chronic infection

- currently a combination of pegylated interferon-alpha and ribavirin are used
- up to 55% of patients successfully clear the virus, with success rates of around 80% for some strains
- the aim of treatment is sustained virological response (SVR), defined as undetectable

serum HCV RNA six months after the end of therapy

Complications of treatment

- ribavirin - side-effects: haemolytic anaemia, cough. Women should not become pregnant within 6 months of stopping ribavirin as it is teratogenic
- interferon alpha - side-effects: flu-like symptoms, depression, fatigue, leukopenia, thrombocytopenia



Question 97 of 117

Next

A 45-year-old man is noted to have non-tender, smooth hepatomegaly associated Dupuytren's contracture and parotid enlargement. He recently returned from a holiday in Thailand. What is the likely diagnosis?

- | | |
|-----------------------|---------------------|
| <input type="radio"/> | A. Primary hepatoma |
| <input type="radio"/> | B. Hydatid disease |



C. Alcoholic liver disease



D. Viral hepatitis



E. Tricuspid regurgitation

Next question

Both Dupuytren's contracture and parotitis are associated with alcoholic liver disease. Whilst a history of alcohol excess would normally be volunteered it should be remembered many patients will lie about their alcohol intake

The recent holiday in Thailand is a distractor.

Hepatomegaly

Common causes of hepatomegaly

- Cirrhosis: if early disease, later liver decreases in size. Associated with a non-tender, firm liver
- Malignancy: metastatic spread or primary hepatoma. Associated with a hard, irregular. liver edge
- Right heart failure: firm, smooth, tender liver edge. May be pulsatile

Other causes

- viral hepatitis
- glandular fever
- malaria
- abscess: pyogenic, amoebic
- hydatid disease
- haematological malignancies
- haemochromatosis
- primary biliary cirrhosis
- sarcoidosis, amyloidosis



A man presents with severe vomiting. He reports not being able to keep fluids down for the past 12 hours. You suspect a diagnosis of gastroenteritis and on discussing possible causes he mentions reheating curry with rice the night before. What is the most likely causative organism?



- ☐ A. *Escherichia coli*
- ☐ B. *Campylobacter*
- ☐ C. *Salmonella*
- ☐ D. *Shigella*
- ☒ E. *Bacillus cereus*

Next question

Bacillus cereus infection most commonly results from reheated rice.

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea

Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours




Question 99 of 117

Next

Which one of the following causes of diarrhoea has the shortest incubation period?

- ☐ A. *Salmonella*

- ☐ B. *Shigella*
- ☐ C. *Campylobacter*
- ☐ D. *Escherichia coli*
-  ☒ E. *Bacillus cereus*

Next question

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

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Stereotypical histories

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- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



Question 100 of 117

Next

Which of the following drugs is least likely to cause cholestasis?



- | | |
|----------------------------------|----------------------|
| <input type="radio"/> | A. Anabolic steroids |
| <input type="radio"/> | B. Erythromycin |
| <input type="radio"/> | C. Prochlorperazine |
| <input checked="" type="radio"/> | D. Methylphenidate |



E. Flucloxacillin

[Next question](#)

Drug-induced liver disease

Drug-induced liver disease is generally divided into hepatocellular, cholestatic or mixed. There is however considerable overlap, with some drugs causing a range of changes to the liver

The following drugs tend to cause a hepatocellular picture:

- paracetamol
- sodium valproate, phenytoin
- MAOIs
- halothane
- anti-tuberculosis: isoniazid, rifampicin, pyrazinamide
- statins
- alcohol
- amiodarone
- methyldopa
- nitrofurantoin

The following drugs tend to cause cholestasis (+/- hepatitis):

- oral contraceptive pill
- antibiotics: flucloxacillin, co-amoxiclav, erythromycin*
- anabolic steroids, testosterone
- phenothiazines: chlorpromazine, prochlorperazine
- sulphonylureas
- fibrates
- rare reported causes: nifedipine

Liver cirrhosis

- methotrexate
- methyldopa
- amiodarone

*risk may be reduced with erythromycin stearate



Question 101 of 117

Next

Each one of the following is a recognised complication of gastro-oesophageal reflux disease, except:



<input type="radio"/>	A. Oesophageal carcinoma
<input type="radio"/>	B. Barrett's oesophagus
<input type="radio"/>	C. Anaemia
<input checked="" type="radio"/>	D. Achalasia
<input type="radio"/>	E. Benign strictures



Next question

Gastro-oesophageal reflux disease: management

Gastro-oesophageal reflux disease (GORD) may be defined as symptoms of oesophagitis secondary to refluxed gastric contents

NICE recommend that GORD which has not been investigated with endoscopy should be treated as per the dyspepsia guidelines

Endoscopically proven oesophagitis

- full dose proton pump inhibitor (PPI) for 1-2 months
- if response then low dose treatment as required
- if no response then double-dose PPI for 1 month

Endoscopically negative reflux disease

- full dose PPI for 1 month

- if response then offer low dose treatment, possibly on an as-required basis, with a limited number of repeat prescriptions
- if no response then H2RA or prokinetic for one month

Complications

- oesophagitis
- ulcers
- anaemia
- benign strictures
- Barrett's oesophagus
- oesophageal carcinoma



Question 102 of 117

Next

You are reviewing a patient with Crohn's disease. Which one of the following extra-intestinal manifestations of Crohn's disease is related to disease activity?



<input type="radio"/>	A. Uveitis
<input checked="" type="radio"/>	B. Erythema nodosum
<input type="radio"/>	C. Primary sclerosing cholangitis
<input type="radio"/>	D. Clubbing
<input type="radio"/>	E. Pyoderma gangrenosum

Next question

Crohn's disease

Crohn's disease is a form of inflammatory bowel disease. It commonly affects the terminal ileum and colon but may be seen anywhere from the mouth to anus.

Pathology

- cause is unknown but there is a strong genetic susceptibility
- inflammation occurs in all layers, down to the serosa. This is why patients with Crohn's are prone to strictures, fistulas and adhesions

Crohn's disease typically presents in late adolescence or early adulthood. Features include:

- presentation may be non-specific symptoms such as weight loss and lethargy
- diarrhoea: the most prominent symptom in adults. Crohn's colitis may cause bloody diarrhoea
- abdominal pain: the most prominent symptom in children
- perianal disease: e.g. Skin tags or ulcers
- extra-intestinal features are more common in patients with colitis or perianal disease

Questions regarding the 'extra-intestinal' features of inflammatory bowel disease are common:

	Common to both Crohn's disease (CD) and Ulcerative colitis (UC)	Notes
Related to disease activity	Arthritis: pauciarticular, asymmetric Erythema nodosum Episcleritis Osteoporosis	Arthritis is the most common extra-intestinal feature in both CD and UC Episcleritis is more common in CD
Unrelated to disease activity	Arthritis: polyarticular, symmetric Uveitis Pyoderma gangrenosum Clubbing Primary sclerosing cholangitis	Primary sclerosing cholangitis is much more common in UC Uveitis is more common in UC



Question 103 of 117

[Next](#)

You review a 24-year-old female who has recently been diagnosed with left-sided ulcerative colitis. Five days ago she was started on high-dose oral mesalazine by the gastroenterologists. There has

yet to be any change in her stool pattern of passing around 3-4 loose motions/day, which have small amounts of blood in them. She remains systemically well and abdominal examination is unremarkable. How long should the initial mesalazine treatment be taken for before deciding whether it has been successful?

- | | |
|----------------------------------|-------------|
| <input type="radio"/> | A. 7 days |
| <input type="radio"/> | B. 2 weeks |
| <input checked="" type="radio"/> | C. 4 weeks |
| <input type="radio"/> | D. 2 months |
| <input type="radio"/> | E. 4 months |

Next question

Ulcerative colitis: management

Treatment can be divided into inducing and maintaining remission. NICE released guidelines on the management of ulcerative colitis in 2013.

The severity of UC is usually classified as being mild, moderate or severe:

- mild: < 4 stools/day, only a small amount of blood
- moderate: 4-6 stools/day, varying amounts of blood, no systemic upset
- severe: >6 bloody stools per day + features of systemic upset (pyrexia, tachycardia, anaemia, raised inflammatory markers)

Inducing remission

- treatment depends on the extent and severity of disease
- rectal (topical) aminosaliclates or steroids: for distal colitis rectal mesalazine has been shown to be superior to rectal steroids and oral aminosaliclates
- oral aminosaliclates
- oral prednisolone is usually used second-line for patients who fail to respond to aminosaliclates. NICE recommend waiting around 4 weeks before deciding if first-line treatment has failed

- severe colitis should be treated in hospital. Intravenous steroids are usually given first-line

Maintaining remission

- oral aminosalicylates e.g. mesalazine
- azathioprine and mercaptopurine
- methotrexate is not recommended for the management of UC (in contrast to Crohn's disease)
- there is some evidence that probiotics may prevent relapse in patients with mild to moderate disease



Question 104 of 117

Next

A 68-year-old woman comes back for review. Two weeks ago she presented with pain in her left knee not responding to paracetamol and was commenced on diclofenac 50mg tds and lansoprazole 30mg od. Shortly afterwards she developed some indigestion which seems to resolve if she skips the diclofenac dose. She is otherwise asymptomatic and got good pain relief from diclofenac. Clinical examination is normal. What is the most appropriate action?



<input type="radio"/>	A. ¹³ C-urea breath test
<input checked="" type="radio"/>	B. Stop diclofenac, continue lansoprazole + review in 1 week
<input type="radio"/>	C. Switch diclofenac to ibuprofen, continue lansoprazole
<input type="radio"/>	D. Refer urgently for endoscopy
<input type="radio"/>	E. Admit

Next question

When NICE first published their dyspepsia guidelines there was a policy of referral for any older patients with new onset dyspepsia. This led to a deluge of referrals and amended guidelines were published in 2004. This modified approach seems to be supported by a large trial demonstrating a minimal effect on mortality of routine referral.

This question gives an example of a scenario where NICE would recommend not initially referring a patient when there is an obvious trigger (NSAID use).

Dyspepsia

In 2014 NICE updated their guidelines for the management of dyspepsia. These take into account the age of the patient (whether younger or older than 55 years) and the presence or absence of 'alarm signs':

- chronic gastrointestinal bleeding
- progressive unintentional weight loss
- progressive difficulty swallowing
- persistent vomiting
- iron deficiency anaemia
- epigastric mass
- suspicious barium meal

Deciding whether urgent referral for endoscopy is needed

Urgent referral (within 2 weeks) is indicated for patients with any alarm signs irrespective of age

Routine endoscopic investigation of patients of any age, presenting with dyspepsia and without alarm signs is not necessary, however

Patients aged 55 years and over should be referred urgently for endoscopy if dyspepsia symptoms are:

- recent in onset rather than recurrent and
- unexplained (e.g. New symptoms which cannot be explained by precipitants such as NSAIDs) and
- persistent: continuing beyond a period that would normally be associated with self-limiting problems (e.g. Up to four to six weeks, depending on the severity of signs and symptoms)

Managing patients who do not meet referral criteria ('undiagnosed dyspepsia')

This can be summarised at a step-wise approach

- 1. Review medications for possible causes of dyspepsia
- 2. Lifestyle advice

- 3. Trial of full-dose PPI for one month*
- 4. 'Test and treat' using carbon-13 urea breath test

*it is unclear from studies whether a trial of a PPI or a 'test and treat' should be used first

Next

Which one of the following is not associated with non-alcoholic steatohepatitis?

- | | | |
|---|-----------------------|-------------------------------------|
|  | <input type="radio"/> | A. Hyperlipidaemia |
| | <input type="radio"/> | B. Obesity |
| | <input type="radio"/> | C. Sudden weight loss or starvation |
| | <input type="radio"/> | D. Jejunoileal bypass |
|  | <input type="radio"/> | E. Type 1 diabetes mellitus |

Next question

Obese T2DM with abnormal LFTs - ? Non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease (NAFLD) is now the most common cause of liver disease in the developed world. It is largely caused by obesity and describes a spectrum of disease ranging from:

- steatosis - fat in the liver
- steatohepatitis - fat with inflammation, non-alcoholic steatohepatitis (NASH), see below
- progressive disease may cause fibrosis and liver cirrhosis

NAFLD is thought to represent the hepatic manifestation of the metabolic syndrome and hence insulin resistance is thought to be the key mechanism leading to steatosis

Non-alcoholic steatohepatitis (NASH) is a term used to describe liver changes similar to those seen in alcoholic hepatitis in the absence of a history of alcohol abuse. It is relatively common and thought to affect around 3-4% of the general population. The progression of disease in patients with NASH may be responsible for a proportion of patients previously labelled as cryptogenic cirrhosis

Associated factors

- obesity
- hyperlipidaemia
- type 2 diabetes mellitus
- jejunioileal bypass
- sudden weight loss/starvation

Features

- usually asymptomatic
- hepatomegaly
- ALT is typically greater than AST
- increased echogenicity on ultrasound

Management

- the mainstay of treatment is lifestyle changes (particularly weight loss) and monitoring
- there is ongoing research into the role of gastric banding and insulin-sensitising drugs (e.g. Metformin)



Question 106 of 117

Next

What advice should you give a non-pregnant woman who asks how much alcohol can she drink?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Should drink no more than 14 units of alcohol per week (and no more than 2 units in any one day) |
| <input checked="" type="radio"/> | B. Should drink no more than 14 units of alcohol per week (and no more than 3 units in any one day) |

<input type="radio"/>	C.	Should drink no more than 7-14 units of alcohol per week (and no more than 2 units in any one day)
<input type="radio"/>	D.	Should drink no more than 21 units of alcohol per week (and no more than 3 units in any one day)
<input type="radio"/>	E.	Should drink no more than 7 units of alcohol per week (and no more than 2 units in any one day)

Next question

The January 2010 AKT feedback report stated '**Candidates performed poorly in several items related to alcohol. The subject areas included alcohol units, nutrition, treatments for alcohol dependence and complications of alcohol abuse other than liver disease. The NHS Confederation has recently highlighted the increasing burden to the NHS of alcohol related problems and *Candidates* require a broad knowledge of this topic. '**

Alcohol: units

The government currently recommend the following:

- men: should drink no more than 21 units of alcohol per week (and no more than 4 units in any one day)
- women: should drink no more than 14 units of alcohol per week (and no more than 3 units in any one day)

One unit of alcohol is equal to 10 ml of alcohol. The 'strength' of an alcoholic drink is determined by the 'alcohol by volume' (ABV).

Examples of one unit of alcohol:

- 25ml single measure of spirits (ABV 40%)
- a third of a pint of beer (ABV 5 to 6%)
- half a 175ml 'standard' glass of red wine (ABV 12%)

To calculate the number of units in a drink multiply the number of millilitres by the ABV and divide by 1,000. For example:

- half a 175ml 'standard' glass of red wine = $87.5 \times 12 / 1000 = 1.05$ units
- one bottle of wine = $750 \times 12 / 1000 = 9$ units

- one pint of 5% beer or lager = $568 \times 5 / 1000 = 2.8$ units



Question 107 of 117

Next

You follow-up a 42-year-old man who has just completed a two week course of *Helicobacter pylori* therapy for dyspepsia. How soon can you perform a urea breath test to test for eradication, assuming he has stopped his eradication therapy today and is taking no other medication?



- | | |
|----------------------------------|--------------------|
| <input type="radio"/> | A. Straight away |
| <input type="radio"/> | B. In 1 weeks time |
| <input type="radio"/> | C. In 2 weeks time |
| <input checked="" type="radio"/> | D. In 4 weeks time |
| <input type="radio"/> | E. In 8 weeks time |

Next question

***Helicobacter pylori*: tests**

Urea breath test

- patients consume a drink containing carbon isotope 13 (^{13}C) enriched urea
- urea is broken down by *H. pylori* urease
- after 30 mins patient exhale into a glass tube
- mass spectrometry analysis calculates the amount of ^{13}C CO_2
- should not be performed within 4 weeks of treatment with an antibacterial or within 2 weeks of an antisecretory drug (e.g. a proton pump inhibitor)
- sensitivity 95-98%, specificity 97-98%

Rapid urease test (e.g. CLO test)

- biopsy sample is mixed with urea and pH indicator

- colour change if H pylori urease activity
- sensitivity 90-95%, specificity 95-98%

Serum antibody

- remains positive after eradication
- sensitivity 85%, specificity 80%

Culture of gastric biopsy

- provide information on antibiotic sensitivity
- sensitivity 70%, specificity 100%

Gastric biopsy

- histological evaluation alone, no culture
- sensitivity 95-99%, specificity 95-99%

Stool antigen test

- sensitivity 90%, specificity 95%



Question 108 of 117

Next

One of your patients who is an intravenous drug user contracts the hepatitis C virus. What percentage of such patients will become chronically infected with hepatitis C?



☐ A. 30-35%



☒ B. 80-85%

<input type="radio"/>	C.	50-60%
<input type="radio"/>	D.	5-10%
<input type="radio"/>	E.	15-20%

[Next question](#)

Hepatitis C - 80-85% become chronically infected

Hepatitis C

Hepatitis C is likely to become a significant public health problem in the UK in the next decade. It is thought around 200,000 people are chronically infected with the virus. At risk groups include intravenous drug users and patients who received a blood transfusion prior to 1991 (e.g. haemophiliacs).

Pathophysiology

- hepatitis C is a RNA flavivirus
- incubation period: 6-9 weeks

Transmission

- the risk of transmission during a needle stick injury is about 2%
- the vertical transmission rate from mother to child is about 6%
- breast feeding is not contraindicated in mothers with hepatitis C
- the risk of transmitting the virus during sexual intercourse is probably less than 5%

Features

- after exposure to the hepatitis C virus less than 20% of patients develop an acute hepatitis

Complications

- chronic infection (80-85%) - only 15-20% of patients will clear the virus after an acute infection and hence the majority will develop chronic hepatitis C
- cirrhosis (20-30% of those with chronic disease)
- hepatocellular cancer
- cryoglobulinaemia
- porphyria cutanea tarda (PCT): it is increasingly recognised that PCT may develop in patients with hepatitis C, especially if there are other factors such as alcohol abuse

Management of chronic infection

- currently a combination of pegylated interferon-alpha and ribavirin are used
- up to 55% of patients successfully clear the virus, with success rates of around 80% for some strains
- the aim of treatment is sustained virological response (SVR), defined as undetectable

serum HCV RNA six months after the end of therapy

Complications of treatment

- ribavirin - side-effects: haemolytic anaemia, cough. Women should not become pregnant within 6 months of stopping ribavirin as it is teratogenic
- interferon alpha - side-effects: flu-like symptoms, depression, fatigue, leukopenia, thrombocytopenia



Question 109 of 117

Next

A 55-year-old business man presents with a 15 day history of watery, non-bloody diarrhoea associated with anorexia and abdominal bloating. His symptoms started 4 days after returning from a trip to Pakistan. On examination he is afebrile with dry mucous membranes but normal skin turgor. What is the most likely causative organism?



- | | |
|----------------------------------|---------------------------|
| <input type="radio"/> | A. <i>Salmonella</i> |
| <input checked="" type="radio"/> | B. <i>Giardia lamblia</i> |
| <input type="radio"/> | C. <i>Shigella</i> |

<input type="radio"/>	D. <i>Escherichia coli</i>
<input type="radio"/>	E. Norovirus

Next question

Although *Escherichia coli* is the most common cause of travellers' diarrhoea, in this particular case the length of illness and nature of symptoms (bloating, watery diarrhoea) points to a diagnosis of Giardiasis.

Giardiasis

Giardiasis is caused by the flagellate protozoan *Giardia lamblia*. It is spread by the faeco-oral route

Features

- often asymptomatic
- lethargy, bloating, abdominal pain
- non-bloody diarrhoea
- chronic diarrhoea, malabsorption and lactose intolerance can occur
- stool microscopy for trophozoite and cysts are classically negative, therefore duodenal fluid aspirates or 'string tests' (fluid absorbed onto swallowed string) are sometimes needed

Treatment is with metronidazole



Question 110 of 117

Next

Which one of the following drugs used in the management of diabetes mellitus is most likely to cause cholestasis?

<input checked="" type="radio"/>	A. Metformin
<input checked="" type="radio"/>	B. Gliclazide
<input type="radio"/>	C. Acarbose
<input type="radio"/>	D. Rosiglitazone



E. Insulin

[Next question](#)

Drug-induced liver disease

Drug-induced liver disease is generally divided into hepatocellular, cholestatic or mixed. There is however considerable overlap, with some drugs causing a range of changes to the liver

The following drugs tend to cause a hepatocellular picture:

- paracetamol
- sodium valproate, phenytoin
- MAOIs
- halothane
- anti-tuberculosis: isoniazid, rifampicin, pyrazinamide
- statins
- alcohol
- amiodarone
- methyldopa
- nitrofurantoin

The following drugs tend to cause cholestasis (+/- hepatitis):

- oral contraceptive pill
- antibiotics: flucloxacillin, co-amoxiclav, erythromycin*
- anabolic steroids, testosterone
- phenothiazines: chlorpromazine, prochlorperazine
- sulphonylureas
- fibrates
- rare reported causes: nifedipine

Liver cirrhosis

- methotrexate
- methyldopa
- amiodarone

*risk may be reduced with erythromycin stearate



Question 111 of 117

Next

A 25-year-old man with a history of Crohn's disease is reviewed. Over the past week he has developed painful perianal ulcers. On examination numerous shallow ulcers can be seen with a small number of skin tags. What is the most appropriate first-line treatment?



- | | |
|----------------------------------|-------------------------------|
| <input type="radio"/> | A. Topical mesalazine |
| <input checked="" type="radio"/> | B. Oral metronidazole |
| <input type="radio"/> | C. Barrier creams + laxatives |
| <input type="radio"/> | D. Oral prednisolone |
| <input checked="" type="radio"/> | E. Oral mesalazine |

Next question

Crohn's - perianal disease: oral metronidazole is first-line

Please see the British Society of Gastroenterology guidelines for more details.

Crohn's disease: management

Crohn's disease is a form of inflammatory bowel disease. It commonly affects the terminal ileum and colon but may be seen anywhere from the mouth to anus. NICE published guidelines on the management of Crohn's disease in 2012.

General points

- patients should be strongly advised to stop smoking
- some studies suggest an increased risk of relapse secondary to NSAIDs and the combined oral contraceptive pill but the evidence is patchy

Inducing remission

- glucocorticoids (oral, topical or intravenous) are generally used to induce remission. Budesonide is an alternative in a subgroup of patients
- enteral feeding with an elemental diet may be used in addition to or instead of other measures to induce remission, particularly if there is concern regarding the side-effects of steroids (for example in young children)
- 5-ASA drugs (e.g. mesalazine) are used second-line to glucocorticoids but are not as effective
- azathioprine or mercaptopurine* may be used as an add-on medication to induce remission but is not used as monotherapy. Methotrexate is an alternative to azathioprine
- infliximab is useful in refractory disease and fistulating Crohn's. Patients typically continue on azathioprine or methotrexate
- metronidazole is often used for isolated peri-anal disease

Maintaining remission

- as above, stopping smoking is a priority (remember: smoking makes Crohn's worse, but may help ulcerative colitis)
- azathioprine or mercaptopurine is used first-line to maintain remission
- methotrexate is used second-line
- 5-ASA drugs (e.g. mesalazine) should be considered if a patient has had previous surgery

Surgery

- around 80% of patients with Crohn's disease will eventually have surgery

*assess thiopurine methyltransferase (TPMT) activity before offering azathioprine or mercaptopurine

0 / 3 **Question 112-114 of 117**

Next

Theme: Dysphagia

A. Pharyngeal pouch

B. Achalasia

C.	Globus hystericus
D.	Systemic sclerosis
E.	Oesophageal cancer
F.	Myasthenia gravis
G.	Oesophagitis
H.	Motor neuron disease
I.	Oesophageal candidiasis
J.	Plummer-Vinson syndrome

For each one of the following scenarios please select the most likely diagnosis:

112. A 54-year-old man presents with a 3 month history of 'heartburn'. He has noticed that swallowing is painful, particularly when he eats meat or bread. After eating and at night he has an 'unpleasant' retrosternal sensation. Clinical examination is unremarkable

 You answered Pharyngeal pouch

The correct answer is Oesophagitis

113. A 67-year-old woman presents with a 5 week history of food getting stuck. She is currently treated for COPD and was recently noted to have a macrocytosis on routine bloods. On a number of occasions she has vomited during the meal and says she has no taste for food any more.

 You answered Pharyngeal pouch

The correct answer is Oesophageal cancer

Smoking (COPD) and alcohol (macrocytosis) are risk factors for oesophageal cancer

114. A 43-year-old woman with a history of anxiety complains of problems swallowing. On examination she is noted to have a number of small white lumps on her hands and telangiectasia on her face

 You answered Pharyngeal pouch

The correct answer is Systemic sclerosis

Next question

Dysphagia

The table below gives characteristic exam question features for conditions causing dysphagia:

Oesophageal cancer	Dysphagia may be associated with weight loss, anorexia or vomiting during eating Past history may include Barrett's oesophagus, GORD, excessive smoking or alcohol use
Oesophagitis	May be history of heartburn Odynophagia but no weight loss and systemically well
Oesophageal candidiasis	There may be a history of HIV or other risk factors such as steroid inhaler use
Achalasia	Dysphagia of both liquids and solids from the start Heartburn Regurgitation of food - may lead to cough, aspiration pneumonia etc
Pharyngeal pouch	More common in older men Represents a posteromedial herniation between thyropharyngeus and cricopharyngeus muscles Usually not seen but if large then a midline lump in the neck that gurgles on palpation Typical symptoms are dysphagia, regurgitation, aspiration and chronic cough. Halitosis may occasionally be seen
Systemic sclerosis	Other features of CREST syndrome may be present, namely Calcinosis, Raynaud's phenomenon, oEsophageal dysmotility, Sclerodactyly, Telangiectasia As well as oesophageal dysmotility the lower oesophageal sphincter (LES) pressure is decreased. This contrasts to achalasia where the LES pressure is increased
Myasthenia gravis	Other symptoms may include extraocular muscle weakness or ptosis Dysphagia with liquids as well as solids
Globus hystericus	May be history of anxiety Symptoms are often intermittent and relieved by swallowing Usually painless - the presence of pain should warrant further investigation for organic causes



Question 115 of 117

Next

A 30-year-old woman presents with abdominal pain that is associated with alternating diarrhoea and constipation. Which one of the following symptoms is least consistent with a diagnosis of irritable bowel syndrome?



☐ A. Feeling of incomplete stool evacuation



☒ B. Waking at night due to the pain

☐ C. Abdominal bloating

☐ D. Faecal urgency

☐ E. Passage of mucous with stool

Next question

Pain which wakes a patient at night is not a feature that would be expected in irritable bowel syndrome.

Irritable bowel syndrome: diagnosis

NICE published clinical guidelines on the diagnosis and management of irritable bowel syndrome (IBS) in 2008

The diagnosis of IBS should be considered if the patient has had the following for at least 6 months:

- abdominal pain, and/or
- bloating, and/or
- change in bowel habit

A positive diagnosis of IBS should be made if the patient has abdominal pain relieved by defecation or associated with altered bowel frequency stool form, in addition to 2 of the following 4 symptoms:

- altered stool passage (straining, urgency, incomplete evacuation)
- abdominal bloating (more common in women than men), distension, tension or hardness
- symptoms made worse by eating
- passage of mucus

Features such as lethargy, nausea, backache and bladder symptoms may also support the diagnosis

Red flag features should be enquired about:

- rectal bleeding
- unexplained/unintentional weight loss
- family history of bowel or ovarian cancer
- onset after 60 years of age

Suggested primary care investigations are:

- full blood count
- ESR/CRP
- coeliac disease screen (tissue transglutaminase antibodies)



Question 116 of 117

Next

A 34-year-old male is admitted with central abdominal pain radiating through to the back and vomiting. The following results are obtained:

Amylase	1,245 u/dl
---------	------------

Which one of the following medications is most likely to be responsible?



- | | |
|----------------------------------|---------------------|
| <input type="radio"/> | A. Phenytoin |
| <input checked="" type="radio"/> | B. Sodium valproate |
| <input type="radio"/> | C. Metoclopramide |
| <input type="radio"/> | D. Sumatriptan |
| <input type="radio"/> | E. Pizotifen |

Next question

Sodium valproate induced pancreatitis is more common in young adults and tends to occur within

the first few months of treatment. Asymptomatic elevation of the amylase level is seen in up to 10% of patients

Acute pancreatitis: causes

The vast majority of cases in the UK are caused by gallstones and alcohol

Popular mnemonic is **GET SMASHED**

- **G**allstones
- **E**thanol
- **T**rauma
- **S**teroids
- **M**umps (other viruses include Coxsackie B)
- **A**utoimmune (e.g. polyarteritis nodosa), **A**scaris infection
- **S**corpion venom
- **H**ypertriglyceridaemia, **H**yperchylomicronaemia, **H**ypercalcaemia, **H**ypothermia
- **E**RCP
- **D**rugs (azathioprine, mesalazine*, didanosine, bendroflumethiazide, furosemide, pentamidine, steroids, sodium valproate)

*pancreatitis is 7 times more common in patients taking mesalazine than sulfasalazine



Question 117 of 117

Which of the following is not a recognised complication of coeliac disease?



<input checked="" type="radio"/>	A. Hypersplenism
<input type="radio"/>	B. Lymphoma of the small intestine
<input type="radio"/>	C. Osteoporosis
<input type="radio"/>	D. Oesophageal cancer
<input type="radio"/>	E. Subfertility

Hypo-, not hypersplenism is seen in coeliac disease

Coeliac disease

Coeliac disease is caused by sensitivity to the protein gluten. Repeated exposure leads to villous atrophy which in turn causes malabsorption. Conditions associated with coeliac disease include dermatitis herpetiformis (a vesicular, pruritic skin eruption) and autoimmune disorders (type 1 diabetes mellitus and autoimmune hepatitis). It is strongly associated with HLA-DQ2 (95% of patients) and HLA-B8 (80%) as well as HLA-DR3 and HLA-DR7

In 2009 NICE issued guidelines on the investigation of coeliac disease. They suggest that the following patients should be screened for coeliac disease:

Signs and symptoms	Conditions
<ul style="list-style-type: none">• Chronic or intermittent diarrhoea• Failure to thrive or faltering growth (in children)• Persistent or unexplained gastrointestinal symptoms including nausea and vomiting• Prolonged fatigue ('tired all the time')• Recurrent abdominal pain, cramping or distension• Sudden or unexpected weight loss• Unexplained iron-deficiency anaemia, or other unspecified anaemia	<ul style="list-style-type: none">• Autoimmune thyroid disease• Dermatitis herpetiformis• Irritable bowel syndrome• Type 1 diabetes• First-degree relatives (parents, siblings or children) with coeliac disease

Complications

- anaemia: iron, folate and vitamin B12 deficiency (folate deficiency is more common than vitamin B12 deficiency in coeliac disease)
- hyposplenism
- osteoporosis, osteomalacia
- lactose intolerance
- enteropathy-associated T-cell lymphoma of small intestine
- subfertility, unfavourable pregnancy outcomes
- rare: oesophageal cancer, other malignancies



Question 1 of 39

Next

A 67-year-old woman is reviewed a week after being diagnosed with having a deep vein thrombosis of her left leg. After receiving low-molecular weight heparin for 5 days she has now been started on warfarin. She has a history of depression, osteoporosis, breast cancer and type 2 diabetes.

Which one of her current medications is most likely to have increased her risk of developing a deep vein thrombosis?



<input type="radio"/>	A. Trazadone
<input checked="" type="radio"/>	B. Tamoxifen
<input type="radio"/>	C. Sitagliptin
<input type="radio"/>	D. Denosumab
<input type="radio"/>	E. Rosuvastatin

Next question

Tamoxifen increases the risk of VTE + endometrial cancer

One of the most important adverse effects of tamoxifen is the increased risk of VTE. Women should be counselled about this prior to starting treatment.

Venous thromboembolism: risk factors

Common predisposing factors include malignancy, pregnancy and the period following an operation. The comprehensive list below is partly based on the 2010 SIGN venous thromboembolism (VTE) guidelines:

General

- increased risk with advancing age
- obesity
- family history of VTE
- pregnancy (especially puerperium)
- immobility
- hospitalisation

- anaesthesia
- central venous catheter: femoral >> subclavian

Underlying conditions

- malignancy
- thrombophilia: e.g. Activated protein C resistance, protein C and S deficiency
- heart failure
- antiphospholipid syndrome
- Behcet's
- polycythaemia
- nephrotic syndrome
- sickle cell disease
- paroxysmal nocturnal haemoglobinuria
- hyperviscosity syndrome
- homocystinuria

Medication

- combined oral contraceptive pill: 3rd generation more than 2nd generation
- hormone replacement therapy: the risk of VTE is higher in women taking oestrogen + progestogen preparations compared to those taking oestrogen only preparations
- raloxifene and tamoxifen
- antipsychotics (especially olanzapine) have recently been shown to be a risk factor

It should be remembered however that around 40% of patients diagnosed with a PE have no major risk factors.





Question 2 of 39

Next

A 65-year-old woman presents with painful, red skin on the inside of her thigh. This has developed over the past 4-5 days and has not happened before. She is normally fit and well and no past medical history of note other than depression. On examination she has erythematous, tender skin on the medial aspect of her right thigh consistent with the long saphenous vein. The vein is palpable

and cord-like. There is no associated swelling of the right calf and no history of chest pain or dyspnoea. Heart rate is 84/min and her temperature is 37.0°C. What is the most appropriate management?

-  ☐ A. Prescribe an oral NSAID
- ☐ B. Prescribe a topical NSAID
-  ☒ C. Refer for an ultrasound scan
- ☐ D. Prescribe a topical heparinoid
- ☐ E. Prescribe an oral NSAID and oral flucloxacillin

[Next question](#)

SIGN recommend referring patients with long saphenous vein superficial thrombophlebitis for an ultrasound scan to exclude an underlying DVT

Superficial thrombophlebitis

Superficial thrombophlebitis, as the name suggests describes the inflammation associated with thrombosis of one of the superficial veins, usually the long saphenous vein of the leg. This process is usually non-infective in nature but secondary bacterial infection may rarely occur resulting in septic thrombophlebitis.

Around 20% with superficial thrombophlebitis will have an underlying deep vein thrombosis (DVT) at presentation and 3-4% of patients will progress to a DVT if untreated. The risk of DVT is partly linked to the length of vein affected - an inflamed vein > 5 cm is more likely to have an associated DVT.

Management

There are currently a variety of treatment approaches to superficial thrombophlebitis. Traditionally NSAIDs have been used, with topical NSAIDs for limited and mild disease and oral NSAIDs for more severe disease.

Topical heparinoids have also be used in the management of superficial thrombophlebitis.

A Cochrane review however found topical NSAIDs and heparinoids have no significant benefit in terms of reducing extension or progression to DVT. Oral NSAIDs were however shown to reduce the risk of extension by 67%.

Compression stockings are also used. Remember that the ankle-brachial pressure index (ABPI) should be measured before prescribing compression stockings, particularly if using class 2 or above stockings.

One of the major changes to the management of superficial thrombophlebitis is the increased use of low-molecular weight heparin. This has been shown to reduce extension and transformation to DVT. SIGN produced guidelines in 2010:

Patients with clinical signs of superficial thrombophlebitis affecting the proximal long saphenous vein should have an ultrasound scan to exclude concurrent DVT.

- *Patients with superficial thrombophlebitis should have anti-embolism stockings and can be considered for treatment with prophylactic doses of LMWH for up to 30 days or fondaparinux for 45 days.*
- *If LMWH is contraindicated, 8-12 days of oral NSAIDS should be offered.*

Patients with superficial thrombophlebitis at, or extending towards, the sapheno-femoral junction can be considered for therapeutic anticoagulation for 6-12 weeks.

This may be a significant departure from our current practice - the majority of patients with superficial thrombophlebitis (i.e. those affecting the long saphenous vein) should be referred for an ultrasound scan.



Question 3 of 39

Next

A 64-year-old man with a history of depression and lumbar spinal stenosis presents with a swollen and painful left calf. He is seen in the DVT clinic and found to have a raised D-dimer. He therefore undergoes a Doppler scan which shows a proximal deep vein thrombosis. The patient reports being active and otherwise well. He has not recently had any surgery or been immobile for any prolonged

period. He is started on low-molecular weight heparin and referred to the warfarin clinic. What is the most appropriate duration of warfarin treatment?

	<input type="radio"/>	A. 6 week
	<input type="radio"/>	B. 3 months
	<input checked="" type="radio"/>	C. 6 months
	<input type="radio"/>	D. 12 months
	<input type="radio"/>	E. Lifelong

[Next question](#)

Venous thromboembolism - length of warfarin treatment

- provoked (e.g. recent surgery): 3 months
- unprovoked: 6 months

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1

Clinical feature	Points
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more
- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE

- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



Question 4 of 39

Next

Which one of the following statements regarding novel oral anticoagulants (NOACs) is correct?



- ☐ A. The advantage of apixaban over other NOACs is rapid reversal of anticoagulation in an emergency
- ☐ B. Dabigatran is mainly excreted via the liver
- ☐ C. Rivaroxaban is a vitamin K antagonist
- ☐ D. Rivaroxaban should be avoided in patients with a history of ischaemic heart disease
- ☒ E. Dabigatran may be used to reduce the risk of stroke in atrial fibrillation



Next question

Novel oral anticoagulants (NOACs)

The table below summaries the three NOACs: dabigatran, rivaroxaban and apixaban.

	Dabigatran	Rivaroxaban	Apixaban
UK brand name	Pradaxa	Xarelto	Eliquis
Mechanism of action	Direct thrombin inhibitor	Direct factor Xa inhibitor	Direct factor Xa inhibitor
Route	Oral	Oral	Oral

	Dabigatran	Rivaroxaban	Apixaban
Excretion	Majority renal	Majority liver	Majority faecal
NICE indications	Prevention of VTE following hip/knee surgery Prevention of stroke in non-valvular AF*	Prevention of VTE following hip/knee surgery Treatment of DVT and PE Prevention of stroke in non-valvular AF*	Prevention of VTE following hip/knee surgery Prevention of stroke in non-valvular AF*

*NICE stipulate that certain other risk factors should be present. These are complicated and differ between the NOACs but generally require one of the following to be present:

- prior stroke or transient ischaemic attack
- age 75 years or older
- hypertension
- diabetes mellitus
- heart failure



Question 5 of 39

Next

A 63-year-old female on long-term warfarin for atrial fibrillation attends the anticoagulation clinic. Despite having a stable INR for the past 4 years on the same dose of warfarin her INR is measured at 5.4. Which one of the following is most likely to be responsible?



- ☐ A. St John's Wort
- ☐ B. Smoking
- ☐ C. Carrot juice
- ☒ D. Cranberry juice
- ☐ E. Camomile tea



Next question

St John's Wort is an inducer of the P450 enzyme system so would cause the INR to decrease, rather than increase.

Warfarin

Warfarin is an oral anticoagulant which inhibits the reduction of vitamin K to its active hydroquinone form, which in turn acts as a cofactor in the carboxylation of clotting factor II, VII, IX and X (mnemonic = 1972) and protein C.

Indications

- venous thromboembolism: target INR = 2.5, if recurrent 3.5
- atrial fibrillation, target INR = 2.5
- mechanical heart valves, target INR depends on the valve type and location. Mitral valves generally require a higher INR than aortic valves.

Patients on warfarin are monitored using the INR (international normalised ratio), the ratio of the prothrombin time for the patient over the normal prothrombin time. Warfarin has a long half-life and achieving a stable INR may take several days. There a variety of loading regimes and computer software is now often used to alter the dose.

Factors that may potentiate warfarin

- liver disease
- P450 enzyme inhibitors, e.g.: amiodarone, ciprofloxacin
- cranberry juice
- drugs which displace warfarin from plasma albumin, e.g. NSAIDs
- inhibit platelet function: NSAIDs

Side-effects

- haemorrhage
- teratogenic, although can be used in breast-feeding mothers
- skin necrosis: when warfarin is first started biosynthesis of protein C is reduced. This results in a temporary procoagulant state after initially starting warfarin, normally avoided by concurrent heparin administration. Thrombosis may occur in venules leading to skin necrosis
- purple toes



Question 6 of 39

Next

Which one of the following statements regarding the aetiology of venous thromboembolism (VTE) is correct?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Third generation combined oral contraceptive pills are safer than second generation ones |
| <input type="radio"/> | B. VTE develops in around 5% of patients with rheumatoid arthritis |
| <input type="radio"/> | C. Female gender is a risk factor recurrent VTE |
| <input type="radio"/> | D. The second trimester of pregnancy is associated with a greater risk than the puerperium |
| <input checked="" type="radio"/> | E. Tamoxifen therapy increases the risk of VTE |



Next question

Venous thromboembolism: risk factors

Common predisposing factors include malignancy, pregnancy and the period following an operation. The comprehensive list below is partly based on the 2010 SIGN venous thromboembolism (VTE) guidelines:

General

- increased risk with advancing age
- obesity
- family history of VTE
- pregnancy (especially puerperium)
- immobility
- hospitalisation
- anaesthesia
- central venous catheter: femoral >> subclavian

Underlying conditions

- malignancy
- thrombophilia: e.g. Activated protein C resistance, protein C and S deficiency
- heart failure
- antiphospholipid syndrome
- Behcet's
- polycythaemia
- nephrotic syndrome
- sickle cell disease
- paroxysmal nocturnal haemoglobinuria
- hyperviscosity syndrome
- homocystinuria

Medication

- combined oral contraceptive pill: 3rd generation more than 2nd generation
- hormone replacement therapy: the risk of VTE is higher in women taking oestrogen + progestogen preparations compared to those taking oestrogen only preparations
- raloxifene and tamoxifen
- antipsychotics (especially olanzapine) have recently been shown to be a risk factor

It should be remembered however that around 40% of patients diagnosed with a PE have no major risk factors.



Question 7 of 39

Next

A 45-year-old woman is reviewed shortly after being diagnosed with having a pulmonary embolism. Around two weeks ago she was admitted with a severe community-acquired pneumonia which resulted in her being ventilated and admitted to ITU. She responded well to intravenous antibiotics but shortly before discharge became more short-of-breath again. A CTPA was requested which showed a pulmonary embolism. She is started immediately on dalteparin. What is the most appropriate next step?



A. Switch to warfarin for 6 weeks



B. Switch to warfarin for 3 months

- ☐ C. Switch to warfarin for 6 months
- ☐ D. Keep on dalteparin for 6 weeks
- ☐ E. Keep on dalteparin for 3 months

Next question

NICE recommend warfarin (termed in the guidance a VKA or vitamin-K antagonist) for 3 months in patients with a provoked venous thromboembolism:

1.2.3 Offer a VKA to patients with confirmed proximal DVT or PE within 24 hours of diagnosis and continue the VKA for 3 months. At 3 months, assess the risks and benefits of continuing VKA treatment (see recommendations 1.2.4 and 1.2.5 below).

1.2.4 Offer a VKA beyond 3 months to patients with an unprovoked PE, taking into account the patient's risk of VTE recurrence and whether they are at increased risk of bleeding. Discuss with the patient the benefits and risks of extending their VKA treatment.

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1

Clinical feature	Points
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more
- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
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- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

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- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE
- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



Question 8 of 39

Next

A 72-year-old woman with breast cancer presents with a swollen, painful left calf. She is known to have metastases in the vertebral bodies and is taking denosumab as prophylaxis. A Doppler ultrasound is arranged which shows a proximal deep vein thrombosis on the left side. This is her first episode of venous thromboembolism. What is the most appropriate management?



- ☐ A. Warfarin for 3 months
- ☒ B. Warfarin for 6 months
- ☐ C. Low-molecular weight heparin for 3 months
- ☒ D. Low-molecular weight heparin for 6 months
- ☐ E. Dabigatran for 3 months

Next question

Cancer patients with VTE - 6 months of LMWH

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
------------------	--------

Clinical feature	Points
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An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

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If a DVT is 'likely' (2 points or more)

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If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:

- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE
- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



Question 9 of 39

Next

A 50-year-old with a history of breast cancer presents to her local GP surgery with a two-day history of left-sided calf swelling. What is the most appropriate scoring system to use to assess her risk of having a deep vein thrombosis (DVT)?



<input checked="" type="radio"/>	A. Wells score
<input type="radio"/>	B. Rockall score
<input type="radio"/>	C. DVT-A2 score
<input type="radio"/>	D. Marlow score
<input type="radio"/>	E. Stockholm score



Next question

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more
- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE
- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



Question 10 of 39

Next

A 61-year-old woman comes for review. Around one year ago she finished a 6 month course of warfarin after being diagnosed with an unprovoked, proximal deep vein thrombosis. For the past few weeks she has been experiencing 'heaviness' and 'aching' in the the same leg. This is associated with an itch and some swelling, although this seems to go down each night. Past medical history of note includes osteoarthritis and type 2 diabetes mellitus.

On examination prominent varicose veins are seen on the affected leg with some brown discolouration of the skin above the medial malleolus. There is no difference in the circumference of the calves. Her temperature is 36.9°C, pulse 78/min and blood pressure 108/82 mmHg. What is the most likely diagnosis?



<input type="radio"/>	A. Recurrence of deep vein thrombosis
<input checked="" type="radio"/>	B. Post-thrombotic syndrome
<input type="radio"/>	C. Cellulitis
<input type="radio"/>	D. Ruptured Baker's cyst
<input type="radio"/>	E. Necrobiosis lipoidica

Next question

The slowly progressive symptoms of pruritus and pain accompanied by the examination findings are strongly suggestive of post-thrombotic syndrome.

Post-thrombotic syndrome

It is increasingly recognised that patients may develop complications following a DVT. Venous outflow obstruction and venous insufficiency result in chronic venous hypertension. The resulting clinical syndrome is known as post thrombotic syndrome. The following features maybe seen:

- painful, heavy calves
- pruritus
- swelling
- varicose veins
- venous ulceration

Compression stockings should be offered to all patients with deep vein thrombosis to help reduce the risk of post-thrombotic syndrome.

NICE state the following:

Offer below-knee graduated compression stockings with an ankle pressure greater than 23 mmHg to patients with proximal DVT a week after diagnosis or when swelling is reduced sufficiently and if there are no contraindications, and:

- *advise patients to continue wearing the stockings for at least 2 years*
- *ensure that the stockings are replaced two or three times per year or according to the manufacturer's instructions*
- *advise patients that the stockings need to be worn only on the affected leg or legs.*



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Next

A 60-year-old woman develops a deep vein thrombosis (DVT) 10 days after having a hip replacement despite taking prophylactic dose low-molecular weight heparin (LMWH). She has no

significant past medical history of note other than osteoarthritis. After being diagnosed she is started on treatment dose LMWH. What is the most appropriate anticoagulation strategy?

- ☐ A. Continue on treatment dose LMWH for 6 weeks
- ☒ B. Continue on treatment dose LMWH for 3 months
- ☐ C. Continue on treatment dose LMWH for 6 months
- ☒ D. Switch to warfarin for 3 months
- ☐ E. Switch to warfarin for 6 months

Next question

Venous thromboembolism - length of warfarin treatment

- provoked (e.g. recent surgery): 3 months
- unprovoked: 6 months

The recent surgery is an obvious 'provoking' factor for the DVT. She should therefore be anticoagulated for 3 months.

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1

Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
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Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
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Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more
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If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
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If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE

- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



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Next

A 24-year-old nulliparous female with a history of recurrent deep vein thrombosis presents with shortness of breath. The full blood count and clotting screen reveals the following results:

Hb	12.4 g/dl
Plt	137
WBC	$7.5 \times 10^9/l$
PT	14 secs
APTT	46 secs

What is the most likely underlying diagnosis?



- ☐ A. Third generation oral contraceptive pill use
- ☐ B. Protein C deficiency
- ☐ C. Antithrombin III deficiency
- ☒ D. Antiphospholipid syndrome
- ☐ E. Activated protein C resistance

Next question

Antiphospholipid syndrome: (paradoxically) prolonged APTT + low platelets

The combination of a prolonged APTT and thrombocytopenia make antiphospholipid syndrome the most likely diagnosis

Antiphospholipid syndrome

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

A key point for the exam is to appreciate that antiphospholipid syndrome causes a paradoxical rise in the APTT. This is due to an ex-vivo reaction of the lupus anticoagulant autoantibodies with phospholipids involved in the coagulation cascade

Features

- venous/arterial thrombosis
- recurrent fetal loss
- livedo reticularis
- thrombocytopenia
- prolonged APTT
- other features: pre-eclampsia, pulmonary hypertension

Associations other than SLE

- other autoimmune disorders
- lymphoproliferative disorders
- phenothiazines (rare)

Management - based on BCSH guidelines

- initial venous thromboembolic events: evidence currently supports use of warfarin with a target INR of 2-3 for 6 months
- recurrent venous thromboembolic events: lifelong warfarin; if occurred whilst taking warfarin then increase target INR to 3-4
- arterial thrombosis should be treated with lifelong warfarin with target INR 2-3



A 34-year-old female presents due to the development of a purpuric rash on the back of her legs. Her only regular medication is Microgynon 30. She also reports frequent nose bleeds and menorrhagia. A full blood count is requested:

Hb	11.7 g/dl
Platelets	$62 \times 10^9/l$
WCC	$5.3 \times 10^9/l$

What is the most likely diagnosis?

- ☐ A. Drug-induced thrombocytopenia
- ☒ B. Henoch-Schonlein purpura
- ☐ C. Thrombotic thrombocytopenic purpura
- ☒ D. Idiopathic thrombocytopenic purpura
- ☐ E. Antiphospholipid syndrome

Next question

The isolated thrombocytopenia in a well patient points to a diagnosis of ITP. The combined oral contraceptive pill does not commonly cause blood dyscrasias

ITP

Idiopathic thrombocytopenic purpura (ITP) is an immune mediated reduction in the platelet count. Antibodies are directed against the glycoprotein IIb/IIIa or Ib-V-IX complex.

ITP can be divided into acute and chronic forms:

Acute ITP

- more commonly seen in children
- equal sex incidence
- may follow an infection or vaccination
- usually runs a self-limiting course over 1-2 weeks

Chronic ITP

- more common in young/middle-aged women
- tends to run a relapsing-remitting course

Evan's syndrome

- ITP in association with autoimmune haemolytic anaemia (AIHA)



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Next

You receive the blood results of a 76-year-old man who takes warfarin following a pulmonary embolism two months ago. He recently completed a course of antibiotics.

INR	8.4
-----	-----

On reviewing the patient he is well with no bleeding or bruising. What is the most appropriate action?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Stop warfarin + restart when INR < 5.0 + give low-molecular weight heparin until warfarin restarted |
| <input type="radio"/> | B. Stop warfarin + restart when INR < 3.0 |
| <input checked="" type="radio"/> | C. Oral vitamin K 5mg + stop warfarin + repeat INR after 24 hours |
| <input type="radio"/> | D. Admit |
| <input type="radio"/> | E. Stop warfarin + restart when INR < 5.0 |

Next question

The BNF recommends a dose of between 1 to 5mg of vitamin K in this situation.

Warfarin overdose

The following is based on the BNF guidelines, which in turn take into account the British Committee for Standards in Haematology (BCSH) guidelines. A 2005 update of the BCSH guidelines emphasised the preference of prothrombin complex concentrate over FFP in major bleeding.

Situation	Management
Major bleeding	Stop warfarin Give intravenous vitamin K 5mg Prothrombin complex concentrate - if not available then FFP*
INR > 8.0 Minor bleeding	Stop warfarin Give intravenous vitamin K 1-3mg Repeat dose of vitamin K if INR still too high after 24 hours Restart warfarin when INR < 5.0
INR > 8.0 No bleeding	Stop warfarin Give vitamin K 1-5mg by mouth, using the intravenous preparation orally Repeat dose of vitamin K if INR still too high after 24 hours Restart when INR < 5.0
INR 5.0-8.0 Minor bleeding	Stop warfarin Give intravenous vitamin K 1-3mg Restart when INR < 5.0
INR 5.0-8.0 No bleeding	Withhold 1 or 2 doses of warfarin Reduce subsequent maintenance dose

*as FFP can take time to defrost prothrombin complex concentrate should be considered in cases of intracranial haemorrhage



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Next

A patient with glucose-6-phosphate dehydrogenase (G6PD) deficiency presents for advice about malaria prophylaxis. He is about to go on a 'gap year' during which he will be travelling abroad for 12 months. Which one of the following medications is it most important that he avoids?

- ☐ A. Artemether with lumefantrine
- ☐ B. Mefloquine
- ☒ C. Proguanil

- | | |
|----------------------------------|----------------|
| <input type="radio"/> | D. Doxycycline |
| <input checked="" type="radio"/> | E. Primaquine |

[Next question](#)

G6PD deficiency

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is the commonest red blood cell enzyme defect. It is more common in people from the Mediterranean and Africa and is inherited in a X-linked recessive fashion. Many drugs can precipitate a crisis as well as infections and broad (fava) beans

Pathophysiology

- \downarrow G6PD \rightarrow \downarrow glutathione \rightarrow increased red cell susceptibility to oxidative stress

Features

- neonatal jaundice is often seen
- intravascular haemolysis
- gallstones are common
- splenomegaly may be present
- Heinz bodies on blood films

Diagnosis is made by using a G6PD enzyme assay

Some drugs causing haemolysis

- anti-malarials: primaquine
- ciprofloxacin
- sulph- group drugs: sulphonamides, sulphasalazine, sulfonyleureas

Some drugs thought to be safe

- penicillins
- cephalosporins
- macrolides

- tetracyclines
- trimethoprim

Comparing G6PD deficiency to hereditary spherocytosis

	G6PD deficiency	Hereditary spherocytosis
Gender	Male (X-linked recessive)	Male + female (autosomal dominant)
Ethnicity	African + Mediterranean descent	Northern European descent
Typical history	<ul style="list-style-type: none"> • Neonatal jaundice • Infection/drugs precipitate haemolysis • Gallstones 	<ul style="list-style-type: none"> • Neonatal jaundice • Chronic symptoms although haemolytic crises may be precipitated by infection • Gallstones • Splenomegaly is common
Blood film	Heinz bodies	Spherocytes (round, lack of central pallor)
Diagnostic test	Measure enzyme activity of G6PD	Osmotic fragility test





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Next

A 73-year-old woman presents with lethargy for the past two weeks. Clinical examination is unremarkable. Her past medical history includes polymyalgia rheumatica and ischaemic heart disease. Screening blood tests are ordered and the full blood count is reported as follows:

Hb	12.9 g/dl
Plt	$158 \times 10^9/l$
WBC	$19.0 \times 10^9/l$
Neuts	$4.2 \times 10^9/l$
Lymphs	$14.1 \times 10^9/l$

What is the most likely diagnosis?

	<input type="radio"/>	A. Lymphoma
	<input type="radio"/>	B. Nicorandil-related lymphocytosis
	<input type="radio"/>	C. Transient viral illness
	<input checked="" type="radio"/>	D. Chronic lymphocytic leukaemia
	<input type="radio"/>	E. Secondary to steroid use

Next question

Such a lymphocytosis in an elderly patient is very likely to be caused by chronic lymphocytic leukaemia. Steroids tend to cause a neutrophilia. It would be unusual for a viral illness to cause such a marked lymphocytosis in an elderly person.

Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia (CLL) is caused by a monoclonal proliferation of well-differentiated lymphocytes which are almost always B-cells (99%)

Features

- often none
- constitutional: anorexia, weight loss
- bleeding, infections
- lymphadenopathy more marked than CML

Complications

- hypogammaglobulinaemia leading to recurrent infections
- warm autoimmune haemolytic anaemia in 10-15% of patients
- transformation to high-grade lymphoma (Richter's transformation)

Investigations

- blood film: smudge cells
- immunophenotyping



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Next

A 15-year-old girl presents with abdominal pain. She is normally fit and well and currently takes a combined oral contraceptive pill. The patient is accompanied by her mother, who is known to have hereditary spherocytosis. The pain is located in the upper abdomen and is episodic in nature, but has become severe today. There has been no change to her bowel habit and no nausea or vomiting. What is the most likely diagnosis?

- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Inferior vena cava thrombosis |
| <input checked="" type="radio"/> | B. Acute pancreatitis |
| <input type="radio"/> | C. Renal vein thrombosis |
| <input type="radio"/> | D. Gastritis |
| <input checked="" type="radio"/> | E. Biliary colic |

Next question

This patient has hereditary spherocytosis resulting in chronic haemolysis and gallstone formation. An important differential in a poorly patient with hereditary spherocytosis would be splenic rupture

Hereditary spherocytosis

Basics

- most common hereditary haemolytic anaemia in people of northern European descent
- autosomal dominant defect of red blood cell cytoskeleton
- the normal biconcave disc shape is replaced by a sphere-shaped red blood cell
- red blood cell survival reduced as destroyed by the spleen

Presentation

- failure to thrive
- jaundice, gallstones
- splenomegaly
- aplastic crisis precipitated by parvovirus infection
- degree of haemolysis variable

- MCHC elevated

Diagnosis

- osmotic fragility test

Management

- folate replacement
- splenectomy

Comparing G6PD deficiency to hereditary spherocytosis

	G6PD deficiency	Hereditary spherocytosis
Gender	Male (X-linked recessive)	Male + female (autosomal dominant)
Ethnicity	African + Mediterranean descent	Northern European descent
Typical history	<ul style="list-style-type: none"> • Neonatal jaundice • Infection/drugs precipitate haemolysis • Gallstones 	<ul style="list-style-type: none"> • Neonatal jaundice • Chronic symptoms although haemolytic crises may be precipitated by infection • Gallstones • Splenomegaly is common
Blood film	Heinz bodies	Spherocytes (round, lack of central pallor)
Diagnostic test	Measure enzyme activity of G6PD	Osmotic fragility test





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Next

Your review a 41-year-old woman. Four months ago she developed a deep vein thrombosis and was warfarinised with a target INR of 2.5. She has presented with a swollen, tender left calf and a Doppler scan confirms a further deep vein thrombosis. Her INR has been above 2.0 for the past

three months. You refer the patient to haematology for further investigations. What should happen regarding her anticoagulation?

-  ☐ A. Switch to treatment dose low-molecular weight heparin
- ☐ B. Continue on warfarin, continue with INR target of 2.5
- ☐ C. Add aspirin 75 mg od
- ☐ D. Continue on warfarin, increase INR target to 3.0
-  ☒ E. Continue on warfarin, increase INR target to 3.5

Next question

Warfarin

Warfarin is an oral anticoagulant which inhibits the reduction of vitamin K to its active hydroquinone form, which in turn acts as a cofactor in the carboxylation of clotting factor II, VII, IX and X (mnemonic = 1972) and protein C.

Indications

- venous thromboembolism: target INR = 2.5, if recurrent 3.5
- atrial fibrillation, target INR = 2.5
- mechanical heart valves, target INR depends on the valve type and location. Mitral valves generally require a higher INR than aortic valves.

Patients on warfarin are monitored using the INR (international normalised ratio), the ratio of the prothrombin time for the patient over the normal prothrombin time. Warfarin has a long half-life and achieving a stable INR may take several days. There a variety of loading regimes and computer software is now often used to alter the dose.

Factors that may potentiate warfarin

- liver disease
- P450 enzyme inhibitors, e.g.: amiodarone, ciprofloxacin
- cranberry juice

- drugs which displace warfarin from plasma albumin, e.g. NSAIDs
- inhibit platelet function: NSAIDs

Side-effects

- haemorrhage
- teratogenic, although can be used in breast-feeding mothers
- skin necrosis: when warfarin is first started biosynthesis of protein C is reduced. This results in a temporary procoagulant state after initially starting warfarin, normally avoided by concurrent heparin administration. Thrombosis may occur in venules leading to skin necrosis
- purple toes



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Next

A 48-year-old man presents with a swollen, red and painful left calf. After being referred to the deep vein thrombosis (DVT) clinic he is diagnosed with having a proximal DVT and commenced on low-molecular weight heparin whilst awaiting review by the warfarin clinic.

There is no obvious precipitating factor for this such as recent surgery or a long haul flight. He is generally fit and well and takes no regular medication other than propranolol as migraine prophylaxis. There is no history of venous thromboembolism in his family.

Other than commencing warfarin, what further action, if any, is required?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. No further action is required |
| <input checked="" type="radio"/> | B. Investigate for underlying malignancy + check anti-phospholipid antibodies |
| <input type="radio"/> | C. Check anti-phospholipid antibodies + hereditary thrombophilia screen |
| <input type="radio"/> | D. Check anti-Xa levels |
| <input type="radio"/> | E. Perform an echocardiogram |

Next question

NICE would recommend doing a chest x-ray, blood and urine tests initially to exclude an underlying

malignancy. If these are normal, a CT abdomen and pelvis should be arranged as the patient is > 40 years. They also recommend checking anti-phospholipid antibodies for the first unprovoked DVT/PE. There is no history to support an inherited thrombophilia.

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more

- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE
- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



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Next

A 57-year-old man presents with a painful, swollen right calf. Six weeks ago he underwent an anterior resection for colorectal cancer. On examination his right calf is red and appears swollen, although there is no pitting oedema. There is no swelling above the knee and tenderness is only felt above the achilles tendon. Homan's sign is positive. The circumference of the right calf is 38 cm and on the left side is 36 cm. He is afebrile and whilst the skin is erythematous there is no signs of cellulitis. Minor varicose veins are noted on both legs.

He has no relevant past medical history.

Well's DVT score:

Clinical feature	Points
------------------	--------

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

What is his Well's DVT score?

- ☐ A. 0
- ☐ B. 1
- ☒ C. 2
- ☐ D. 3
- ☐ E. 4

[Next question](#)

This patient score 1 point for active cancer and 1 point for recent major surgery. His Well's DVT score of 2 therefore means that a DVT is 'likely' and he should therefore have a proximal leg vein ultrasound.

Pulmonary embolism: investigation

We know from experience that few patients (around 10%) present with the medical student textbook triad of pleuritic chest pain, dyspnoea and haemoptysis. Pulmonary embolism can be difficult to diagnose as it can present with virtually any cardiorespiratory symptom/sign depending on its location and size.

So which features make pulmonary embolism *more* likely?

The PIOPED study¹ in 2007 looked at the frequency of different symptoms and signs in patients who were diagnosed with pulmonary embolism.

The relative frequency of common clinical signs is shown below:

- Tachypnea (respiratory rate >16/min) - 96%
- Crackles - 58%
- Tachycardia (heart rate >100/min) - 44%
- Fever (temperature >37.8°C) - 43%

It is interesting to note that the Well's criteria for diagnosing a PE use tachycardia rather than tachypnoea.

2012 NICE guidelines

All patients with symptoms or signs suggestive of a PE should have a history taken, examination performed and a chest x-ray to exclude other pathology.

If a PE is still suspected a two-level PE Wells score should be performed:

Clinical feature	Points
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3
An alternative diagnosis is less likely than PE	3
Heart rate > 100 beats per minute	1.5
Immobilisation for more than 3 days or surgery in the previous 4 weeks	1.5
Previous DVT/PE	1.5

Clinical feature	Points
Haemoptysis	1
Malignancy (on treatment, treated in the last 6 months, or palliative)	1

Clinical probability simplified scores

- PE likely - more than 4 points
- PE unlikely - 4 points or less

If a PE is 'likely' (more than 4 points) arrange an immediate computed tomography pulmonary angiogram (CTPA). If there is a delay in getting the CTPA then give low-molecular weight heparin until the scan is performed.

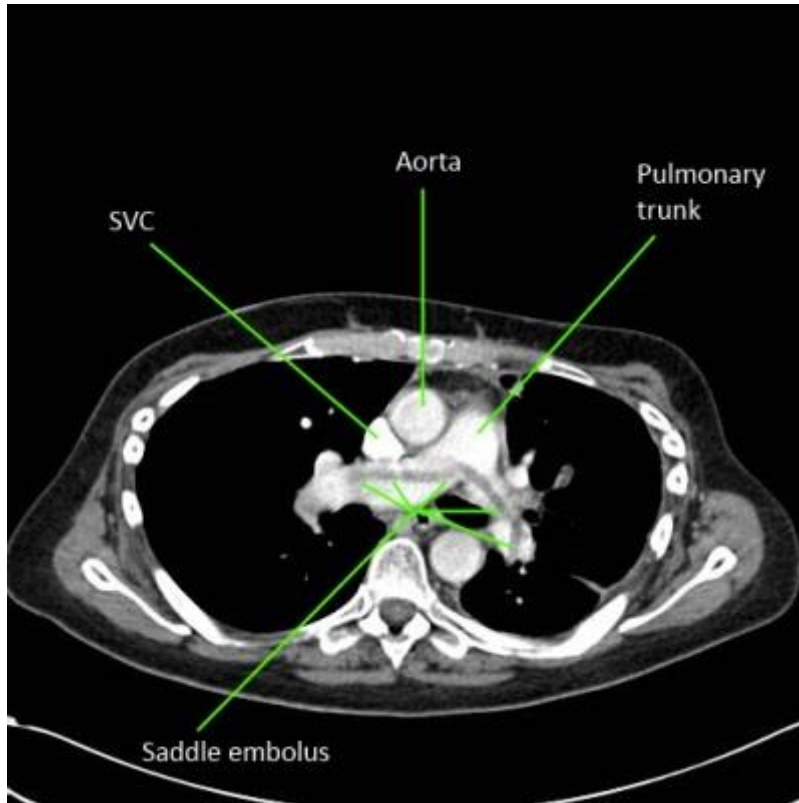
If a PE is 'unlikely' (4 points or less) arranged a D-dimer test. If this is positive arrange an immediate computed tomography pulmonary angiogram (CTPA). If there is a delay in getting the CTPA then give low-molecular weight heparin until the scan is performed.

If the patient has an allergy to contrast media or renal impairment a V/Q scan should be used instead of a CTPA.

CTPA or V/Q scan?

The consensus view from the British Thoracic Society and NICE guidelines is as follows:

- computed tomographic pulmonary angiography (CTPA) is now the recommended initial lung-imaging modality for non-massive PE. Advantages compared to V/Q scans include speed, easier to perform out-of-hours, a reduced need for further imaging and the possibility of providing an alternative diagnosis if PE is excluded
- if the CTPA is negative then patients do not need further investigations or treatment for PE
- ventilation-perfusion scanning may be used initially if appropriate facilities exist, the chest x-ray is normal, and there is no significant symptomatic concurrent cardiopulmonary disease



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Labelled CTPA showing a large saddle embolus



Further CTPA again showing a saddle embolus

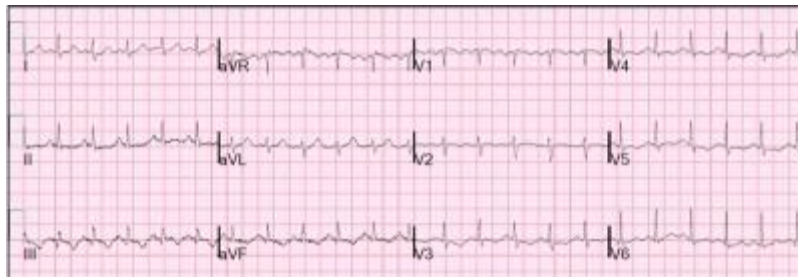
Some other points

D-dimers

- sensitivity = 95-98%, but poor specificity

ECG

- the classic ECG changes seen in PE are a large S wave in lead I, a large Q wave in lead III and an inverted T wave in lead III - 'S1Q3T3'. However this change is seen in no more than 20% of patients
- right bundle branch block and right axis deviation are also associated with PE
- sinus tachycardia may also be seen



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ECG from a patient with a PE. Shows a sinus tachycardia and a partial S1Q3T3 - the S wave is not particularly convincing.



© Image used on license from [Dr Smith, University of Minnesota](#)



ECG of a patient with a PE. It shows some of the ECG features that may be associated with PE (sinus tachycardia, S1, T3 and T wave inversion in the precordial leads). Other features such as the left axis deviation are atypical.

V/Q scan

- sensitivity = 98%; specificity = 40% - high negative predictive value, i.e. if normal virtually excludes PE
- other causes of mismatch in V/Q include old pulmonary embolisms, AV malformations, vasculitis, previous radiotherapy
- COPD gives matched defects

CTPA

- peripheral emboli affecting subsegmental arteries may be missed

Pulmonary angiography

- the gold standard
- significant complication rate compared to other investigations

1. Clinical Characteristics of Patients with Acute Pulmonary Embolism(Data from PIOPED II) Am J Med. Oct 2007; 120(10): 871879.



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Next

A 34-year-old man who is known to have glucose-6-phosphate dehydrogenase deficiency presents to his GP with symptoms of a urinary tract infection. He is prescribed an antibiotic. A few days later he becomes unwell and is noticed by his partner to be pale and jaundiced. What drug is mostly likely to have been prescribed?

- | | |
|-----------------------|-----------------|
| <input type="radio"/> | A. Co-amoxiclav |
| <input type="radio"/> | B. Trimethoprim |



C. Ciprofloxacin



D. Cefalexin



E. Erythromycin

Next question

The sulfamethoxazole in co-trimoxazole causes haemolysis in G6PD, not the trimethoprim

G6PD deficiency

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is the commonest red blood cell enzyme defect. It is more common in people from the Mediterranean and Africa and is inherited in a X-linked recessive fashion. Many drugs can precipitate a crisis as well as infections and broad (fava) beans

Pathophysiology

- \downarrow G6PD \rightarrow \downarrow glutathione \rightarrow increased red cell susceptibility to oxidative stress

Features

- neonatal jaundice is often seen
- intravascular haemolysis
- gallstones are common
- splenomegaly may be present
- Heinz bodies on blood films

Diagnosis is made by using a G6PD enzyme assay

Some drugs causing haemolysis

- anti-malarials: primaquine
- ciprofloxacin
- sulph- group drugs: sulphonamides, sulphasalazine, sulfonyleureas

Some drugs thought to be safe

- penicillins
- cephalosporins
- macrolides
- tetracyclines
- trimethoprim

Comparing G6PD deficiency to hereditary spherocytosis

	G6PD deficiency	Hereditary spherocytosis
Gender	Male (X-linked recessive)	Male + female (autosomal dominant)
Ethnicity	African + Mediterranean descent	Northern European descent
Typical history	<ul style="list-style-type: none">• Neonatal jaundice• Infection/drugs precipitate haemolysis• Gallstones	<ul style="list-style-type: none">• Neonatal jaundice• Chronic symptoms although haemolytic crises may be precipitated by infection• Gallstones• Splenomegaly is common
Blood film	Heinz bodies	Spherocytes (round, lack of central pallor)
Diagnostic test	Measure enzyme activity of G6PD	Osmotic fragility test



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Next

A 25-year-old woman with primary antiphospholipid syndrome is reviewed. She has just had a booking ultrasound at 11 weeks gestation which confirms a viable pregnancy. This is her first pregnancy and she is otherwise fit and well. Which one of the following is the recommend treatment?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Aspirin + prednisolone |
| <input type="radio"/> | B. Low-molecular weight heparin |
| <input checked="" type="radio"/> | C. Prednisolone + low-molecular weight heparin |
| <input checked="" type="radio"/> | D. Aspirin + low-molecular weight heparin |
| <input type="radio"/> | E. Aspirin |

Next question

Antiphospholipid syndrome in pregnancy: aspirin + LMWH

The ultrasound at 11 weeks gestation would show a fetal heart if the pregnancy was viable. This patient should therefore be taking both aspirin and low-molecular weight heparin.

Antiphospholipid syndrome: pregnancy

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

In pregnancy the following complications may occur:

- recurrent miscarriage
- IUGR
- pre-eclampsia
- placental abruption
- pre-term delivery
- venous thromboembolism

Management

- low-dose aspirin should be commenced once the pregnancy is confirmed on urine testing
- low molecular weight heparin once a fetal heart is seen on ultrasound. This is usually discontinued at 34 weeks gestation
- these interventions increase the live birth rate seven-fold



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Next

A 7-year-old male presents with generalised lymphadenopathy. Which one of the following is least likely to result in this presentation?



<input checked="" type="radio"/>	A. Kawasaki disease
<input type="radio"/>	B. Cytomegalovirus
<input type="radio"/>	C. Acute lymphoblastic leukaemia
<input type="radio"/>	D. Phenytoin therapy
<input type="radio"/>	E. Infectious mononucleosis

Next question

Kawasaki disease causes only cervical lymphadenopathy

Lymphadenopathy

There are many causes of generalised lymphadenopathy

Infective

- infectious mononucleosis
- HIV, including seroconversion illness
- eczema with secondary infection
- rubella
- toxoplasmosis
- CMV
- tuberculosis
- roseola infantum

Neoplastic

- leukaemia

- lymphoma

Others

- autoimmune conditions: SLE, rheumatoid arthritis
- graft versus host disease
- sarcoidosis
- drugs: phenytoin and to a lesser extent allopurinol, isoniazid





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Next

A 71-year-old woman who takes warfarin for atrial fibrillation presents with lethargy. A blood test is arranged:

Hb	14.7 g/dl
Plt	$198 \times 10^9/l$
WBC	$5.3 \times 10^9/l$
INR	6.1

What is the most appropriate management?

- ☐ A. Stop warfarin + restart when INR < 3.0
-  ☒ B. Stop warfarin + restart when INR < 5.0 + give low-molecular weight heparin until warfarin restarted
- ☐ C. Oral vitamin K 5mg + stop warfarin + restart when INR < 3.0
-  ☒ D. Withhold 2 doses of warfarin and reduce subsequent maintenance dose
- ☐ E. Admit

Next question

If the INR is between 5.0-8.0 and there is no bleeding the BNF advises that 1-2 doses of warfarin should be withheld and the subsequent maintenance doses reduced.

Warfarin overdose

The following is based on the BNF guidelines, which in turn take into account the British Committee for Standards in Haematology (BCSH) guidelines. A 2005 update of the BCSH guidelines emphasised the preference of prothrombin complex concentrate over FFP in major bleeding.

Situation	Management
Major bleeding	Stop warfarin Give intravenous vitamin K 5mg Prothrombin complex concentrate - if not available then FFP*
INR > 8.0 Minor bleeding	Stop warfarin Give intravenous vitamin K 1-3mg Repeat dose of vitamin K if INR still too high after 24 hours Restart warfarin when INR < 5.0
INR > 8.0 No bleeding	Stop warfarin Give vitamin K 1-5mg by mouth, using the intravenous preparation orally Repeat dose of vitamin K if INR still too high after 24 hours Restart when INR < 5.0
INR 5.0-8.0 Minor bleeding	Stop warfarin Give intravenous vitamin K 1-3mg Restart when INR < 5.0
INR 5.0-8.0 No bleeding	Withhold 1 or 2 doses of warfarin Reduce subsequent maintenance dose

*as FFP can take time to defrost prothrombin complex concentrate should be considered in cases of intracranial haemorrhage



A 66-year-old woman with lung cancer develops a deep vein thrombosis. She is reviewed in the hospital clinic and started on treatment dose low-molecular weight heparin (LMWH). What is the most appropriate treatment plan?

- ☐ A. Switch to warfarin, continue for 6 months
- ☒ B. Switch to warfarin, continue for 3 months
- ☒ C. Continue on LMWH for 6 months
- ☐ D. Continue on LMWH for 6 weeks
- ☐ E. Continue on LMWH for 3 months

[Next question](#)

Cancer patients with VTE - 6 months of LMWH

Patients with active cancer are at continued risk of thrombosis. For this reason a 6 month course of anticoagulation is recommended. Low-molecular weight heparin has the advantage of being more easy to reverse and stop if a cancer-related bleed occurs, for example massive haemoptysis in a patient with lung cancer.

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1

Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more
- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE

- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



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Next

A 69-year-old man who takes warfarin for atrial fibrillation asks for advice. He is due to have a tooth extraction at the dentist and is unsure what to do with regards to his 'blood-thinning' tablets. There is no other past medical history of note. The last INR was taken two weeks ago and reported as 2.2 with his target INR being 2.0-3.0. What is the most appropriate advice?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Switch to low-molecular weight heparin prior to extraction |
| <input checked="" type="radio"/> | B. Switch to aspirin prior to extraction |
| <input checked="" type="radio"/> | C. Check INR 72 hours before procedure, proceed if INR < 4.0 |
| <input type="radio"/> | D. Check INR 72 hours before procedure, proceed if INR < 2.5 |
| <input type="radio"/> | E. Should be performed at local hospital rather than community dentist |

Next question

Dentistry in warfarinised patients - check INR 72 hours before procedure, proceed if INR < 4.0

The BNF gives specific advice with regards to this, in the section 'Prescribing in dental practice'. If a patient has a history of an unstable INR then it should be checked within 24 hours of the dental procedure.

Warfarin

Warfarin is an oral anticoagulant which inhibits the reduction of vitamin K to its active hydroquinone form, which in turn acts as a cofactor in the carboxylation of clotting factor II, VII, IX and X (mnemonic = 1972) and protein C.

Indications

- venous thromboembolism: target INR = 2.5, if recurrent 3.5
- atrial fibrillation, target INR = 2.5
- mechanical heart valves, target INR depends on the valve type and location. Mitral valves generally require a higher INR than aortic valves.

Patients on warfarin are monitored using the INR (international normalised ratio), the ratio of the prothrombin time for the patient over the normal prothrombin time. Warfarin has a long half-life and achieving a stable INR may take several days. There a variety of loading regimes and computer software is now often used to alter the dose.

Factors that may potentiate warfarin

- liver disease
- P450 enzyme inhibitors, e.g.: amiodarone, ciprofloxacin
- cranberry juice
- drugs which displace warfarin from plasma albumin, e.g. NSAIDs
- inhibit platelet function: NSAIDs

Side-effects

- haemorrhage
- teratogenic, although can be used in breast-feeding mothers
- skin necrosis: when warfarin is first started biosynthesis of protein C is reduced. This results in a temporary procoagulant state after initially starting warfarin, normally avoided by concurrent heparin administration. Thrombosis may occur in venules leading to skin necrosis
- purple toes



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Next

A 34-year-old woman with a history of antiphospholipid syndrome presents with a swollen and painful leg. Doppler ultrasound confirms a deep vein thrombosis (DVT). She had a previous DVT 4 months ago and was taking warfarin (with a target INR of 2-3) when the DVT occurred. How should her anticoagulation be managed?



A. Life-long warfarin, increase target INR to 3 - 4



<input type="radio"/>	B.	Add in life-long low-dose aspirin
<input type="radio"/>	C.	A further 6 months warfarin, target INR 2 - 3
<input type="radio"/>	D.	A further 6 months warfarin, target INR 3 - 4
<input type="radio"/>	E.	Life-long warfarin, target INR 2 - 3

Next question

The evidence base is scanty here but most clinicians would increase the target INR to 3-4 if a patient has had a further thrombosis with an INR of 2-3. Please see the BCSH guidelines

Antiphospholipid syndrome

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

A key point for the exam is to appreciate that antiphospholipid syndrome causes a paradoxical rise in the APTT. This is due to an ex-vivo reaction of the lupus anticoagulant autoantibodies with phospholipids involved in the coagulation cascade

Features

- venous/arterial thrombosis
- recurrent fetal loss
- livedo reticularis
- thrombocytopenia
- prolonged APTT
- other features: pre-eclampsia, pulmonary hypertension

Associations other than SLE

- other autoimmune disorders
- lymphoproliferative disorders
- phenothiazines (rare)

Management - based on BCSH guidelines

- initial venous thromboembolic events: evidence currently supports use of warfarin with a target INR of 2-3 for 6 months
- recurrent venous thromboembolic events: lifelong warfarin; if occurred whilst taking warfarin then increase target INR to 3-4
- arterial thrombosis should be treated with lifelong warfarin with target INR 2-3



Question 28 of 39

Next

A 90 year old woman attended her General Practitioner together with her daughter. The patient had becoming increasingly frail over the past few years and her daughter was keen for her to have a general check up. The patient herself felt reasonably well in herself and reported only feeling slightly more tired in recent years with a reduced exercise tolerance. She had a good appetite and denied any weight loss. There was no history of persistent fevers or night sweats and no swollen lymph nodes. Bladder and bowel function was unremarkable except for a long-standing tendency towards constipation.

Past medical history included an abdominal hysterectomy 50 years previously, essential hypertension and osteoarthritis of the hands. The patient had taken amlodipine 5 mg daily for several years but no other regular medications. She lived alone after the death of her husband 5 years previously. The patient was independent with all activities of daily living although had help from her daughter with shopping and cleaning. She mobilised with a walking stick around her bungalow but sometimes used a wheelchair when going on trips with her daughter. She had never smoked and rarely drank alcohol.

On examination, the patient appeared healthy with no signs of jaundice or anaemia. Abdominal, cardiovascular and respiratory examination was unremarkable. Musculoskeletal examination was significant only for boney swelling of the distal and proximal interphalangeal joints of both hands. The patient had good power in her limbs and mobilised freely around the surgery with her stick. She scored 28 / 30 on a mini-mental state examination.

Following assessment, to reassure the patient (and her daughter), basic blood tests were arranged.

Haemoglobin	13.2 g / dL
Mean cell volume	81 fL
White cell count	$6.8 \times 10^9/l$
Neutrophils	$5.4 \times 10^9/l$
Lymphocytes	$0.8 \times 10^9/l$
Monocytes	$0.2 \times 10^9/l$

Eosinophils	$0.3 \times 10^9/l$
Basophils	$0.1 \times 10^9/l$
Platelets	$158 \times 10^9/l$
Urea	5.2 mmol / L
Creatinine	97 micromol / L
Sodium	139 mmol / L
Potassium	3.8 mmol / L
Albumin	32 g / L (reference 35-50)
Alkaline phosphatase	50 U / L (reference 35-100)
ALT	20 U / L (reference 3-36)
Bilirubin	18 micromol / L (reference < 26)
Total protein	58 g / L (reference 60-80)
B12	205 pmol / L (reference 74-516)
Folate	22 nmol / L (reference 7-36)
Thyroid stimulating hormone	0.9 microU / mL (reference 0.4-5.0)

On the computer system you can see the following results from 3 months ago:

Haemoglobin	13.5 g / dL
Mean cell volume	83 fL
White cell count	$6.9 \times 10^9/l$
Neutrophils	$5.5 \times 10^9/l$
Lymphocytes	$0.9 \times 10^9/l$

On further review in clinic, the patient was reassured by discussion of the blood results above. Her daughter however was very concerned about the low lymphocyte count and wanted to know what the next stage in management should be.

What is the appropriate management of the patients lymphopenia?

- ☐ A. Repeat full blood count in 6 weeks
- ☒ B. Serum immunoglobulins
- ☒ C. No further action required
- ☐ D. Anti-nuclear antibody
- ☐ E. Quantiferon test

Next question

Elderly individuals such as the patient in this case have a tendency to lymphopenia and in the absence of concerning symptoms no further investigation of a lymphocyte count of $> 0.5 \times 10^9 / \text{microlitre}$ is necessary.

In a younger patient without significant symptoms a repeat full blood count should be done at an interval to ensure resolution of an isolated lymphopenia. The patient has no symptoms to suggest the other suggested investigations should be performed (all may identify other causes of lymphopenia such as connective tissue disease or tuberculosis).

Brass D, McKay P, Scott F. Investigation an incidental finding of lymphopenia. BMJ 2014;348:g1721.

Lymphopenia

Causes

- common finding in elderly patients. If greater than $0.5 \times 10^9 / \text{l}$ no action is normally needed
- immunosuppressive drugs e.g. methotrexate
- viral infections e.g. HIV
- non-viral infections e.g. tuberculosis, malaria
- autoimmune disorders e.g. rheumatoid
- lymphoproliferative disorders



Question 29 of 39

Next

A 54-year-old woman is reviewed in clinic. She has recently been diagnosed with superficial thrombophlebitis of the long saphenous vein after being referred for an ultrasound scan after a deep vein thrombosis was suspected. What is the most appropriate treatment?



- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Topical NSAID for 2 weeks |
| <input checked="" type="radio"/> | B. Warfarin for 3 months |
| <input type="radio"/> | C. Topical heparinoid for 2 weeks |



D. Low-molecular weight heparin for 30 days



E. Low-molecular weight heparin for 10 days

[Next question](#)

Superficial thrombophlebitis

Superficial thrombophlebitis, as the name suggests describes the inflammation associated with thrombosis of one of the superficial veins, usually the long saphenous vein of the leg. This process is usually non-infective in nature but secondary bacterial infection may rarely occur resulting in septic thrombophlebitis.

Around 20% with superficial thrombophlebitis will have an underlying deep vein thrombosis (DVT) at presentation and 3-4% of patients will progress to a DVT if untreated. The risk of DVT is partly linked to the length of vein affected - an inflamed vein > 5 cm is more likely to have an associated DVT.

Management

There are currently a variety of treatment approaches to superficial thrombophlebitis. Traditionally NSAIDs have been used, with topical NSAIDs for limited and mild disease and oral NSAIDs for more severe disease.

Topical heparinoids have also be used in the management of superficial thrombophlebitis.

A Cochrane review however found topical NSAIDs and heparinoids have no significant benefit in terms of reducing extension or progression to DVT. Oral NSAIDs were however shown to reduce the risk of extension by 67%.

Compression stockings are also used. Remember that the ankle-brachial pressure index (ABPI) should be measured before prescribing compression stockings, particularly if using class 2 or above stockings.

One of the major changes to the management of superficial thrombophlebitis is the increased use of low-molecular weight heparin. This has been shown to reduce extension and transformation to DVT. SIGN produced guidelines in 2010:

Patients with clinical signs of superficial thrombophlebitis affecting the proximal long saphenous vein should have an ultrasound scan to exclude concurrent DVT.

- *Patients with superficial thrombophlebitis should have anti-embolism stockings and can be considered for treatment with prophylactic doses of LMWH for up to 30 days or fondaparinux for 45 days.*
- *If LMWH is contraindicated, 8-12 days of oral NSAIDS should be offered.*

Patients with superficial thrombophlebitis at, or extending towards, the sapheno-femoral junction can be considered for therapeutic anticoagulation for 6-12 weeks.

This may be a significant departure from our current practice - the majority of patients with superficial thrombophlebitis (i.e. those affecting the long saphenous vein) should be referred for an ultrasound scan.



Question 30 of 39

Next

Which of the following findings is not typical in a patient with antiphospholipid syndrome?



<input type="radio"/>	A. Prolonged APTT
<input checked="" type="radio"/>	B. Thrombocytosis
<input type="radio"/>	C. Recurrent venous thrombosis
<input type="radio"/>	D. Recurrent arterial thrombosis
<input type="radio"/>	E. Livedo reticularis

Next question

Antiphospholipid syndrome: arterial/venous thrombosis, miscarriage, livedo reticularis

Thrombocytopenia is associated with antiphospholipid syndrome

Antiphospholipid syndrome

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

A key point for the exam is to appreciate that antiphospholipid syndrome causes a paradoxical rise in the APTT. This is due to an ex-vivo reaction of the lupus anticoagulant autoantibodies with phospholipids involved in the coagulation cascade

Features

- venous/arterial thrombosis
- recurrent fetal loss
- livedo reticularis
- thrombocytopenia
- prolonged APTT
- other features: pre-eclampsia, pulmonary hypertension

Associations other than SLE

- other autoimmune disorders
- lymphoproliferative disorders
- phenothiazines (rare)

Management - based on BCSH guidelines

- initial venous thromboembolic events: evidence currently supports use of warfarin with a target INR of 2-3 for 6 months
- recurrent venous thromboembolic events: lifelong warfarin; if occurred whilst taking warfarin then increase target INR to 3-4
- arterial thrombosis should be treated with lifelong warfarin with target INR 2-3



A 42-year-old female is noted to have a Hb of 17.8 g/dL. Which one of the following is least likely to be the cause?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Polycythaemia rubra vera |
| <input type="radio"/> | B. Chronic obstructive pulmonary disease |
| <input type="radio"/> | C. Hypernephroma |
| <input checked="" type="radio"/> | D. Haemochromatosis |
| <input type="radio"/> | E. Dehydration |

Next question

Haemochromatosis is not associated with polycythaemia. Blood tests typically reveal a raised ferritin and iron, associated with a transferrin saturation of greater than 60% and a low total iron binding capacity

Polycythaemia

Polycythaemia may be relative, primary (polycythaemia rubra vera) or secondary

Relative causes

- dehydration
- stress: Gaisbock syndrome

Primary

- polycythaemia rubra vera

Secondary causes

- COPD
- altitude
- obstructive sleep apnoea

- excessive erythropoietin: cerebellar haemangioma, hypernephroma, hepatoma, uterine fibroids*

To differentiate between true (primary or secondary) polycythaemia and relative polycythaemia red cell mass studies are sometimes used. In true polycythaemia the total red cell mass in males > 35 ml/kg and in women > 32 ml/kg

*uterine fibroids may cause menorrhagia which in turn leads to blood loss - polycythaemia is rarely a clinical problem



Question 32 of 39

Next

A 45-year-old woman is diagnosed with having a proximal deep vein thrombosis three weeks after being treated for a fractured femur secondary to a motorcycle accident. She is started on warfarin with a target INR of 2.0-3.0. In addition to warfarin, which one of the following should also be offered to the patient?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Lansoprazole 15mg od |
| <input checked="" type="radio"/> | B. Aspirin 75mg od |
| <input type="radio"/> | C. A re-scan in 3 months to check for clot resolution |
| <input type="radio"/> | D. A chest x-ray, urinalysis and blood tests including thrombophilia screening |
| <input checked="" type="radio"/> | E. Compression stockings |

Next question

Offer compression stockings to all patients with deep vein thrombosis

Compression stockings should be offered to all patients with deep vein thrombosis to help reduce the risk of post-thrombotic syndrome.

NICE state the following:

Offer below-knee graduated compression stockings with an ankle pressure greater than 23 mmHg to patients with proximal DVT a week after diagnosis or when swelling is reduced sufficiently and if there are no contraindications, and:

- *advise patients to continue wearing the stockings for at least 2 years*
- *ensure that the stockings are replaced two or three times per year or according to the manufacturer's instructions*
- *advise patients that the stockings need to be worn only on the affected leg or legs.*

Post-thrombotic syndrome

It is increasingly recognised that patients may develop complications following a DVT. Venous outflow obstruction and venous insufficiency result in chronic venous hypertension. The resulting clinical syndrome is known as post thrombotic syndrome. The following features maybe seen:

- painful, heavy calves
- pruritus
- swelling
- varicose veins
- venous ulceration

Compression stockings should be offered to all patients with deep vein thrombosis to help reduce the risk of post-thrombotic syndrome.

NICE state the following:

Offer below-knee graduated compression stockings with an ankle pressure greater than 23 mmHg to patients with proximal DVT a week after diagnosis or when swelling is reduced sufficiently and if there are no contraindications, and:

- *advise patients to continue wearing the stockings for at least 2 years*
- *ensure that the stockings are replaced two or three times per year or according to the manufacturer's instructions*
- *advise patients that the stockings need to be worn only on the affected leg or legs.*



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Next

Which one of the following statements regarding warfarin is correct?



<input checked="" type="radio"/>	A. Warfarin can be used when breast-feeding
<input type="radio"/>	B. Hypothyroidism may develop in a small minority of patients
<input type="radio"/>	C. Aortic prosthetic valves generally require a higher INR than mitral valves
<input type="radio"/>	D. The target INR following a pulmonary embolism is 3.5
<input type="radio"/>	E. All patients with an INR of greater than 6.0 should be given vitamin K

Next question

Warfarin

Warfarin is an oral anticoagulant which inhibits the reduction of vitamin K to its active hydroquinone form, which in turn acts as a cofactor in the carboxylation of clotting factor II, VII, IX and X (mnemonic = 1972) and protein C.

Indications

- venous thromboembolism: target INR = 2.5, if recurrent 3.5
- atrial fibrillation, target INR = 2.5
- mechanical heart valves, target INR depends on the valve type and location. Mitral valves generally require a higher INR than aortic valves.

Patients on warfarin are monitored using the INR (international normalised ratio), the ratio of the prothrombin time for the patient over the normal prothrombin time. Warfarin has a long half-life and achieving a stable INR may take several days. There a variety of loading regimes and computer software is now often used to alter the dose.

Factors that may potentiate warfarin

- liver disease

- P450 enzyme inhibitors, e.g.: amiodarone, ciprofloxacin
- cranberry juice
- drugs which displace warfarin from plasma albumin, e.g. NSAIDs
- inhibit platelet function: NSAIDs

Side-effects

- haemorrhage
- teratogenic, although can be used in breast-feeding mothers
- skin necrosis: when warfarin is first started biosynthesis of protein C is reduced. This results in a temporary procoagulant state after initially starting warfarin, normally avoided by concurrent heparin administration. Thrombosis may occur in venules leading to skin necrosis
- purple toes



Question 34 of 39

Next

A 72-year-old woman is brought to surgery with confusion and pallor. Her daughter reports that she has been getting more confused and tired for the past three months. Blood tests are reported as follows:

Hb	8.9 g/dl
MCV	125 fl
Plt	$148 \times 10^9/l$
WBC	$4.4 \times 10^9/l$



In light of the macrocytic anaemia some further tests are ordered:

Intrinsic factor antibodies	Negative
Vitamin B12	94 ng/l (200-900 ng/l)
Folic acid	1.1 nmol/l (> 3.0 nmol/l)

What is the most appropriate management?



A. Perform an ECG immediately

-  ☐ B. Oral folic acid + start Intramuscular vitamin B12 when folic acid levels are normal
-  ☒ C. Intramuscular vitamin B12 + start oral folic acid when vitamin B12 levels are normal
- ☐ D. Refer to the local alcohol dependency services
- ☐ E. Admit for blood transfusion

Next question

It is important in a patient who is also deficient in both vitamin B12 and folic acid to treat the B12 deficiency first to avoid precipitating subacute combined degeneration of the cord. Consideration in this case should also be given to secondary care referral to identify the underlying cause

Macrocytic anaemia

Macrocytic anaemia can be divided into causes associated with a megaloblastic bone marrow and those with a normoblastic bone marrow



Megaloblastic causes	Normoblastic causes
<ul style="list-style-type: none"> • vitamin B12 deficiency • folate deficiency 	<ul style="list-style-type: none"> • alcohol • liver disease • hypothyroidism • pregnancy • reticulocytosis • myelodysplasia • drugs: cytotoxics



Question 35 of 39

Next

Following NICE guidance, which one of the following patients should be screened for a hereditary thrombophilia?

- ☐ A. A 59-year-old woman who has been diagnosed with her second pulmonary embolism three years after her first one
-  ☐ B. A 52-year-old develops a massive pulmonary embolism following an hysterectomy. She has a history of systemic lupus erythematosus
- ☐ C. A 38-year-old woman with an unprovoked pulmonary embolism and no family history
- ☐ D. A 66-year-old man who develops a deep vein thrombosis following knee surgery. His brother recently died following a stroke
-  ☒ E. A 54-year-old woman with an unprovoked deep vein thrombosis. Her sister was diagnosed with a pulmonary embolism three years ago

Next question

The 54-year-old lady has an unprovoked deep vein thrombosis combined with an affected first degree relative. This increases the likelihood of an underlying hereditary thrombophilia.

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

Clinical feature	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1

Clinical feature	Points
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more
- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE
- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



Question 36 of 39

Next

Which of the following skin disorders is most associated with antiphospholipid syndrome?



☐ A. Lichen sclerosis

☐ B. Lichen planus



☒ C. Livedo reticularis

☐ D. Lupus vulgaris

☐ E. Psoriasis

Next question

Antiphospholipid syndrome: arterial/venous thrombosis, miscarriage, livedo reticularis

Livedo reticularis is the skin rash most commonly associated with antiphospholipid syndrome. Lupus vulgaris is seen in tuberculosis

Antiphospholipid syndrome

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

A key point for the exam is to appreciate that antiphospholipid syndrome causes a paradoxical rise in the APTT. This is due to an ex-vivo reaction of the lupus anticoagulant autoantibodies with phospholipids involved in the coagulation cascade

Features

- venous/arterial thrombosis
- recurrent fetal loss
- livedo reticularis
- thrombocytopenia
- prolonged APTT

- other features: pre-eclampsia, pulmonary hypertension

Associations other than SLE

- other autoimmune disorders
- lymphoproliferative disorders
- phenothiazines (rare)

Management - based on BCSH guidelines

- initial venous thromboembolic events: evidence currently supports use of warfarin with a target INR of 2-3 for 6 months
- recurrent venous thromboembolic events: lifelong warfarin; if occurred whilst taking warfarin then increase target INR to 3-4
- arterial thrombosis should be treated with lifelong warfarin with target INR 2-3



Question 37 of 39

Next

A 37-year-old woman is diagnosed with having a deep vein thrombosis (DVT). She is normally fit and well and there were no obvious precipitating factors to explain the DVT. There is also no personal or family history of venous thromboembolism. She is started on warfarin. A review of systems and clinical examination is unremarkable. You arrange a full blood count, serum calcium, liver function tests, antiphospholipid antibodies and urinalysis, all of which are normal. Which further test do NICE recommend?



<input type="radio"/>	A. Abdominal and pelvic ultrasound
<input checked="" type="radio"/>	B. Chest x-ray
<input type="radio"/>	C. CT abdomen pelvis
<input type="radio"/>	D. ECG
<input type="radio"/>	E. Colonoscopy

Deep vein thrombosis: diagnosis and management

Diagnosis

NICE published guidelines in 2012 relating to the investigation and management of deep vein thrombosis (DVT).

If a patient is suspected of having a DVT a two-level DVT Wells score should be performed:

Two-level DVT Wells score

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Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Clinical probability simplified score

- DVT likely: 2 points or more

- DVT unlikely: 1 point or less

If a DVT is 'likely' (2 points or more)

- a proximal leg vein ultrasound scan should be carried out within 4 hours and, if the result is negative, a D-dimer test
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours a D-dimer test should be performed and low-molecular weight heparin administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

If a DVT is 'unlikely' (1 point or less)

- perform a D-dimer test and if it is positive arrange:
- a proximal leg vein ultrasound scan within 4 hours
- if a proximal leg vein ultrasound scan cannot be carried out within 4 hours low-molecular weight heparin should be administered whilst waiting for the proximal leg vein ultrasound scan (which should be performed within 24 hours)

Management

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a DVT is diagnosed.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE add 'consider extending warfarin beyond 3 months for patients with *unprovoked* proximal DVT if their risk of VTE recurrence is high and there is no additional risk of major bleeding'. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months. In practice most clinicians give 6 months of warfarin for patients with an unprovoked DVT/PE
- for patients with active cancer NICE recommend using LMWH for 6 months

Further investigations and thrombophilia screening

As both malignancy and thrombophilia are obvious risk factors for deep vein thrombosis NICE make recommendations on how to investigate patients with unprovoked clots.

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations for cancer:

- a physical examination (guided by the patient's full history) and
- a chest X-ray and
- blood tests (full blood count, serum calcium and liver function tests) and urinalysis.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE

Thrombophilia screening

- not offered if patients will be on lifelong warfarin (i.e. won't alter management)
- consider testing for antiphospholipid antibodies if unprovoked DVT or PE
- consider testing for hereditary thrombophilia in patients who have had unprovoked DVT or PE and who have a first-degree relative who has had DVT or PE



Question 38 of 39

Next

Which one of the following is least associated with antiphospholipid syndrome in pregnancy?



<input type="radio"/>	A. Intra-uterine growth retardation
<input type="radio"/>	B. Placental abruption
<input type="radio"/>	C. Pre-eclampsia
<input checked="" type="radio"/>	D. Placenta praevia



E. Recurrent miscarriage

Next question

Antiphospholipid syndrome: pregnancy

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

In pregnancy the following complications may occur:

- recurrent miscarriage
- IUGR
- pre-eclampsia
- placental abruption
- pre-term delivery
- venous thromboembolism

Management

- low-dose aspirin should be commenced once the pregnancy is confirmed on urine testing
- low molecular weight heparin once a fetal heart is seen on ultrasound. This is usually discontinued at 34 weeks gestation
- these interventions increase the live birth rate seven-fold



Question 39 of 39


Which one of the following is least likely to precipitate haemolysis in a patient with G6PD deficiency?



A. Broad beans



B. Sepsis

	<input type="radio"/>	C. Ciprofloxacin
	<input type="radio"/>	D. Primaquine
	<input checked="" type="radio"/>	E. Penicillin

G6PD deficiency

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is the commonest red blood cell enzyme defect. It is more common in people from the Mediterranean and Africa and is inherited in a X-linked recessive fashion. Many drugs can precipitate a crisis as well as infections and broad (fava) beans

Pathophysiology

- \downarrow G6PD \rightarrow \downarrow glutathione \rightarrow increased red cell susceptibility to oxidative stress

Features

- neonatal jaundice is often seen
- intravascular haemolysis
- gallstones are common
- splenomegaly may be present
- Heinz bodies on blood films

Diagnosis is made by using a G6PD enzyme assay

Some drugs causing haemolysis

- anti-malarials: primaquine
- ciprofloxacin
- sulph- group drugs: sulphonamides, sulphasalazine, sulfonylureas

Some drugs thought to be safe

- penicillins
- cephalosporins

- macrolides
- tetracyclines
- trimethoprim

Comparing G6PD deficiency to hereditary spherocytosis

	G6PD deficiency	Hereditary spherocytosis
Gender	Male (X-linked recessive)	Male + female (autosomal dominant)
Ethnicity	African + Mediterranean descent	Northern European descent
Typical history	<ul style="list-style-type: none"> • Neonatal jaundice • Infection/drugs precipitate haemolysis • Gallstones 	<ul style="list-style-type: none"> • Neonatal jaundice • Chronic symptoms although haemolytic crises may be precipitated by infection • Gallstones • Splenomegaly is common
Blood film	Heinz bodies	Spherocytes (round, lack of central pallor)
Diagnostic test	Measure enzyme activity of G6PD	Osmotic fragility test



Question 1 of 143

Next

A 19-year-old man presents with a compound fracture of his leg following a fall from scaffolding. Examination reveals soiling of the wound with mud. He is sure he has had five previous tetanus vaccinations. What is the most appropriate course of action to prevent the development of tetanus?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Clean wound + intramuscular human tetanus immunoglobulin |
| <input type="radio"/> | B. Clean wound + tetanus vaccine |
| <input type="radio"/> | C. Clean wound + tetanus vaccine + intramuscular human tetanus immunoglobulin |
| <input type="radio"/> | D. Clean wound + tetanus vaccine + benzylpenicillin |
| <input type="radio"/> | E. Clean wound |

Next question

A soiled, compound fracture is regarded as high-risk for tetanus and intramuscular human tetanus immunoglobulin should be given. There is a role for antibiotics given the soiled wound although benzylpenicillin would not be the drug of choice.

Tetanus: vaccination

The tetanus vaccine is a cell-free purified toxin that is normally given as part of a combined vaccine.

Tetanus vaccine is currently given in the UK as part of the routine immunisation schedule at:

- 2 months
- 3 months
- 4 months
- 3-5 years
- 13-18 years

This therefore provides 5 doses of tetanus-containing vaccine. Five doses is now considered to provide adequate long-term protection against tetanus.

Intramuscular human tetanus immunoglobulin should be given to patients with high-risk wounds (e.g. Compound fractures, delayed surgical intervention, significant degree of devitalised tissue) irrespective of whether 5 doses of tetanus vaccine have previously been given

If vaccination history is incomplete or unknown then a dose of tetanus vaccine should be given combined with intramuscular human tetanus immunoglobulin for high-risk wounds

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Next

Theme: School exclusion advice

- | | |
|-----------|--|
| A. | Five days from onset of rash |
| B. | Five days from onset of swollen glands |
| C. | Five days from commencing antibiotics |
| D. | Until symptoms have settled for 48 hours |
| E. | Until lesions have crusted over |
| F. | Until treated |
| G. | No exclusion |
| H. | Until symptoms have settled for 12 hours |

For each one of the following infectious diseases, select the most appropriate advice regarding school exclusion:

2. Whooping cough

 You answered Until symptoms have settled for 12 hours

The correct answer is Five days from commencing antibiotics

3. Roseola

 You answered Five days from onset of rash

The correct answer is No exclusion

4. Diarrhoea and vomiting



You answered Until symptoms have settled for 12 hours

The correct answer is Until symptoms have settled for 48 hours

[Next question](#)

School exclusion

The table below summarises Health Protection Agency guidance on school exclusion

Advice	Condition(s)
No exclusion	Conjunctivitis Fifth disease Roseola Infectious mononucleosis Head lice Threadworms
24 hours after commencing antibiotics	Scarlet fever
Four days from onset of rash	Measles
Five days from onset of rash	Chickenpox
Five days from onset of swollen glands	Mumps
Five days after commencing antibiotics	Whooping cough
Six days from onset of rash	Rubella
Until symptoms have settled for 48 hours	Diarrhoea & vomiting
Until lesions have crusted over	Impetigo
Until treated	Scabies

Until recovered	Influenza
-----------------	-----------

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Next

Theme: BNF antibiotic guidelines

- A. Erythromycin
- B. Trimethoprim or nitrofurantoin or amoxicillin or cephalosporin
- C. Quinolone or trimethoprim
- D. Trimethoprim or vancomycin
- E. Amoxicillin or tetracycline or clarithromycin
- F. Phenoxymethylpenicillin + flucloxacillin
- G. Flucloxacillin
- H. Amoxicillin or cephalosporin or erythromycin
- I. Doxycycline
- J. Broad-spectrum cephalosporin or quinolone

For each one of the following conditions please select the antibiotic choice that best reflects current BNF guidelines:

5. Infective exacerbation of COPD

 Amoxicillin or tetracycline or clarithromycin

6. Acute pyelonephritis

 You answered Quinolone or trimethoprim

The correct answer is Broad-spectrum cephalosporin or quinolone

7. Cellulitis (mild to moderate)

 You answered Erythromycin

The correct answer is Flucloxacillin

[Next question](#)

Antibiotic guidelines

The following is based on current BNF guidelines:

Respiratory system

Condition	Recommended treatment
Exacerbations of chronic bronchitis	Amoxicillin or tetracycline or clarithromycin
Uncomplicated community-acquired pneumonia	Amoxicillin (Doxycycline or clarithromycin in penicillin allergic, add flucloxacillin if staphylococci suspected e.g. In influenza)
Pneumonia possibly caused by atypical pathogens	Clarithromycin
Hospital-acquired pneumonia	Within 5 days of admission: co-amoxiclav or cefuroxime More than 5 days after admission: piperacillin with tazobactam OR a broad-spectrum cephalosporin (e.g. ceftazidime) OR a quinolone (e.g. ciprofloxacin)

Urinary tract

Condition	Recommended treatment
Lower urinary tract infection	Trimethoprim or nitrofurantoin. Alternative: amoxicillin or cephalosporin
Acute pyelonephritis	Broad-spectrum cephalosporin or quinolone
Acute prostatitis	Quinolone or trimethoprim

Skin

Condition	Recommended treatment
Impetigo	Topical fusidic acid, oral flucloxacillin or erythromycin if widespread
Cellulitis	Flucloxacillin (clarithromycin or clindomycin if penicillin-allergic)
Erysipelas	Phenoxymethylpenicillin (erythromycin if penicillin-allergic)
Animal or human bite	Co-amoxiclav (doxycycline + metronidazole if penicillin-allergic)

Ear, nose & throat

Condition	Recommended treatment
Throat infections	Phenoxymethylpenicillin (erythromycin alone if penicillin-allergic)
Sinusitis	Amoxicillin or doxycycline or erythromycin
Otitis media	Amoxicillin (erythromycin if penicillin-allergic)
Otitis externa*	Flucloxacillin (erythromycin if penicillin-allergic)

Genital system

Condition	Recommended treatment
Gonorrhoea	Intramuscular ceftriaxone + oral azithromycin
<i>Chlamydia</i>	Doxycycline or azithromycin
Pelvic inflammatory disease	Oral ofloxacin + oral metronidazole or intramuscular ceftriaxone + oral doxycycline + oral metronidazole
Syphilis	Benzathine benzylpenicillin or doxycycline or erythromycin
Bacterial vaginosis	Oral or topical metronidazole or topical clindamycin

*a combined topical antibiotic and corticosteroid is generally used for mild/moderate cases of otitis externa



Question 8 of 143

Next

Which one of the following people should be offered the annual injectable influenza vaccine?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. A 57-year-old man who had a stroke 15 years ago |
| <input type="radio"/> | B. A 55-year-old hypertensive man who has no complications from his condition |
| <input type="radio"/> | C. A 50-year-old woman with Crohn's disease |
| <input type="radio"/> | D. A 23-year-old man who has asthma. He describes his condition as 'mild' and only uses a salbutamol inhaler |
| <input type="radio"/> | E. A 51-year-old woman with hypothyroidism on thyroxine |

Next question

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)

- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



Question 9 of 143

Next

A 24-year-old woman who is 18 weeks pregnant presents to surgery. Earlier on in the morning she came into contact with a child who has chickenpox. She is unsure if she had the condition herself as a child. What is the most appropriate action?



A. Advise her to present within 24 hours of the rash developing for consideration of IV aciclovir

- | | | |
|----------------------------------|----|--|
| <input type="radio"/> | B. | Reassure her that there is no risk of fetal complications at this point in pregnancy |
| <input type="radio"/> | C. | Give varicella immunoglobulin |
| <input checked="" type="radio"/> | D. | Check varicella antibodies |
| <input type="radio"/> | E. | Prescribe oral aciclovir |

Next question

Chickenpox exposure in pregnancy - first step is to check antibodies

If there is any doubt about the mother previously having chickenpox maternal blood should be checked for varicella antibodies

Chickenpox exposure in pregnancy

Chickenpox is caused by primary infection with varicella zoster virus. Shingles is reactivation of dormant virus in dorsal root ganglion. In pregnancy there is a risk to both the mother and also the fetus, a syndrome now termed fetal varicella syndrome

Fetal varicella syndrome (FVS)

- risk of FVS following maternal varicella exposure is around 1% if occurs before 20 weeks gestation
- studies have shown a very small number of cases occurring between 20-28 weeks gestation and none following 28 weeks
- features of FVS include skin scarring, eye defects (microphthalmia), limb hypoplasia, microcephaly and learning disabilities

Management of chickenpox exposure

- if there is any doubt about the mother previously having chickenpox maternal blood should be checked for varicella antibodies
- if the pregnant woman is not immune to varicella she should be given varicella zoster immunoglobulin (VZIG) as soon as possible. RCOG and Greenbook guidelines suggest VZIG is effective up to 10 days post exposure

- consensus guidelines suggest oral aciclovir should be given if pregnant women with chickenpox present within 24 hours of onset of the rash



Question 10 of 143

Next

A 22-year-old woman who is an immigrant from Malawi presents for review as she thinks she is pregnant. This is confirmed with a positive pregnancy test. She is known to be HIV positive. Which one of the following should NOT be part of the management plan to ensure an optimal outcome?



<input type="radio"/>	A. Oral zidovudine for the newborn until 6 weeks of age
<input type="radio"/>	B. Maternal antiretroviral therapy
<input checked="" type="radio"/>	C. Encourage breast feeding
<input type="radio"/>	D. Intrapartum zidovudine infusion
<input type="radio"/>	E. Elective caesarean section

Next question

The 2008 BHIVA guidelines suggest vaginal delivery may be an option for women on HAART who have an undetectable viral load but whether this will translate into clinical practice remains to be seen

HIV and pregnancy

With the increased incidence of HIV infection amongst the heterosexual population there are an increasing number of HIV positive women giving birth in the UK. In London the incidence may be as high as 0.4% of pregnant women. The aim of treating HIV positive women during pregnancy is to minimise harm to both the mother and fetus, and to reduce the chance of vertical transmission.

Guidelines regularly change on this subject and most recent guidelines can be found using the links provided.

Factors which reduce vertical transmission (from 25-30% to 2%)

- maternal antiretroviral therapy

- mode of delivery (caesarean section)
- neonatal antiretroviral therapy
- infant feeding (bottle feeding)

Screening

- NICE guidelines recommend offering HIV screening to all pregnant women

Antiretroviral therapy

- all pregnant women should be offered antiretroviral therapy regardless of whether they were taking it previously
- if women are not currently taking antiretroviral therapy the RCOG recommend that it is commenced between 28 and 32 weeks of gestation and should be continued intrapartum. BHIVA recommend that antiretroviral therapy may be started at an earlier gestation depending upon the individual situation

Mode of delivery

- vaginal delivery is recommended if viral load is less than 50 copies/ml at 36 weeks, otherwise caesarian section is recommended
- a zidovudine infusion should be started four hours before beginning the caesarean section

Neonatal antiretroviral therapy

- zidovudine is usually administered orally to the neonate if maternal viral load is <50 copies/ml. Otherwise triple ART should be used. Therapy should be continued for 4-6 weeks.

Infant feeding

- in the UK all women should be advised not to breast feed



Question 11 of 143

Next

A 19-year-old woman is diagnosed as having *Chlamydia*. Which one of the following is least associated with untreated infection?



<input type="radio"/>	A. Infertility
<input type="radio"/>	B. Perihepatitis
<input checked="" type="radio"/>	C. Perinephric abscess
<input type="radio"/>	D. Reactive arthritis
<input type="radio"/>	E. Increased incidence of ectopic pregnancy

Next question

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis

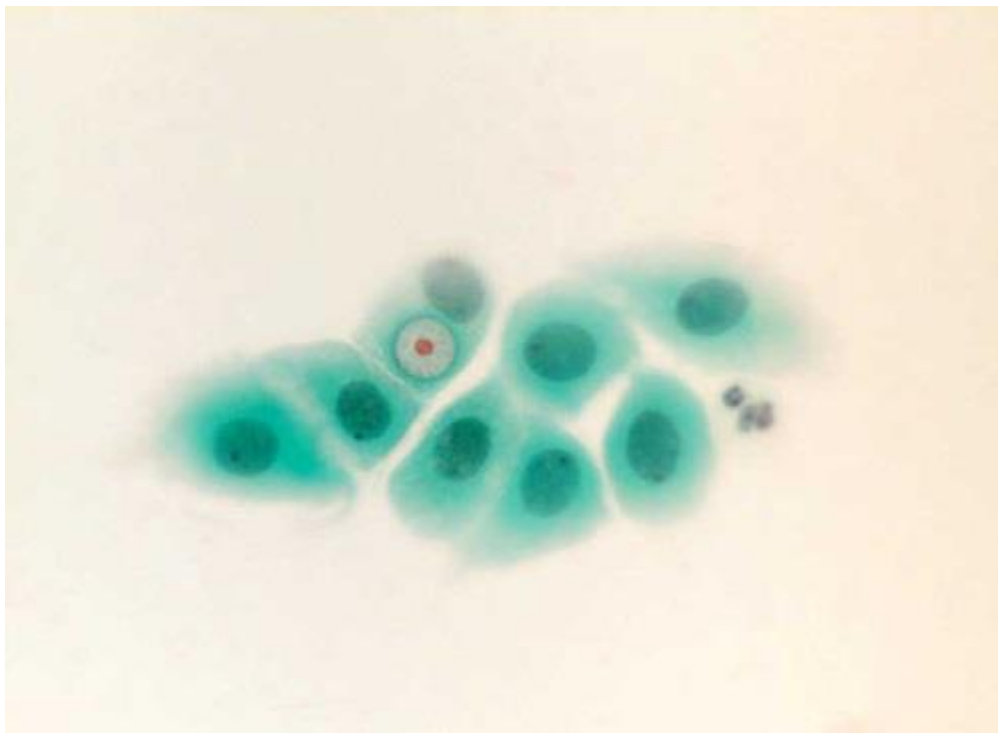
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

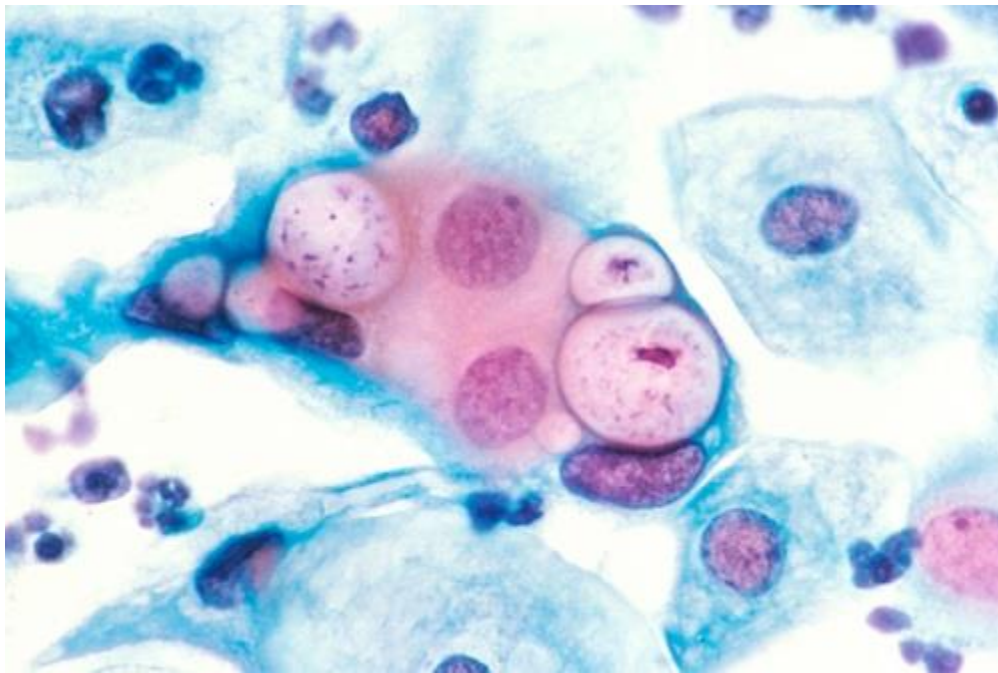


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



Question 12 of 143

Next

A 17-year-old female presents for review. Four days ago she presented to her doctor with a severe sore throat, lethargy and headache. Her doctor prescribed a course of amoxicillin to treat an upper respiratory tract infection. Two days ago she developed a widespread, pruritic maculopapular rash. Her original symptoms have also not improved. What is the most likely diagnosis?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Infectious mononucleosis |
| <input type="radio"/> | B. Kawasaki disease |
| <input type="radio"/> | C. Penicillin allergy |
| <input type="radio"/> | D. HIV seroconversion |
| <input type="radio"/> | E. Beta-lactamase producing streptococcal sore throat |

Next question

URTI symptoms + amoxicillin → rash ?glandular fever

A rash develops in around 99% of patients who take amoxicillin whilst they have infectious mononucleosis. Her treatment should be supportive as detailed below.

Infectious mononucleosis

Infectious mononucleosis (glandular fever) is caused by the Epstein-Barr virus (also known as human herpesvirus 4, HHV-4). It is most common in adolescents and young adults.

Features

- sore throat
- lymphadenopathy
- pyrexia
- malaise, anorexia, headache
- palatal petechiae
- splenomegaly - occurs in around 50% of patients and may rarely predispose to splenic rupture
- hepatitis
- presence of 50% lymphocytes with at least 10% atypical lymphocytes

- haemolytic anaemia secondary to cold agglutins (IgM)
- a maculopapular, pruritic rash develops in around 99% of patients who take ampicillin/amoxicillin whilst they have infectious mononucleosis

Diagnosis

- heterophil antibody test (Monospot test)

Management is supportive and includes:

- rest during the early stages, drink plenty of fluid, avoid alcohol
- simple analgesia for any aches or pains
- consensus guidance in the UK is to avoid playing contact sports for 8 weeks after having glandular fever to reduce the risk of splenic rupture



Question 13 of 143

Next

A 25-year-old man who is usually fit and well presents with a three day history of a cough productive of clear sputum associated with general malaise. His doctor gives him a delayed script for antibiotics. On average, what percentage of patients will eventually take antibiotics if this strategy is employed?

<input type="radio"/>	A. 90%
<input checked="" type="radio"/>	B. 75%
<input type="radio"/>	C. 66%
<input type="radio"/>	D. 50%
<input checked="" type="radio"/>	E. 33%

Next question

Delayed prescribing reduces antibiotic use by two-thirds

Delayed prescribing

Delayed prescribing has come in and out of fashion for many years. NICE currently advocate it as a strategy to reduce antibiotic prescriptions for a respiratory tract infections. There is however still some debate about how effective this is and whether patients find it acceptable.

Cochrane published a review in 2013 of 10 studies looking at the delayed prescription of antibiotics for acute respiratory tract infections. Findings included:

- delayed prescribing reduced antibiotic use from 93% to 32%
- the method of delayed prescribing (e.g. post-dated script, same-day script but with advice to use after 48 hours etc) did not significantly effect whether antibiotics were used
- patient satisfaction levels were not significantly affected

Critics of delayed prescribing point to the other findings of the study suggesting that patient satisfaction levels were just as high for patients who were refused antibiotics.



Question 14 of 143

Next

A 35-year-old homosexual man is referred to the local genitourinary clinic following the development of a solitary painless penile ulcer associated with painful inguinal lymphadenopathy. He has recently developed rectal pain and tenesmus. What is the most likely diagnosis?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Herpes simplex infection |
| <input checked="" type="radio"/> | B. Syphilis |
| <input type="radio"/> | C. Granuloma inguinale |
| <input type="radio"/> | D. Chancroid |



E. Lymphogranuloma venereum

Next question

Genital ulcers

- painful: herpes much more common than chancroid
- painless: syphilis more common than lymphogranuloma venereum

Lymphogranuloma venereum usually involves three stages:

- 1 - small painless pustule which later forms an ulcer
- 2 - painful inguinal lymphadenopathy
- 3 - proctocolitis

STI: ulcers

Genital herpes is most often caused by the herpes simplex virus (HSV) type 2 (cold sores are usually due to HSV type 1). Primary attacks are often severe and associated with fever whilst subsequent attacks are generally less severe and localised to one site

Syphilis is a sexually transmitted infection caused by the spirochaete *Treponema pallidum*. Infection is characterised by primary, secondary and tertiary stages. A painless ulcer (chancre) is seen in the primary stage. The incubation period= 9-90 days

Chancroid is a tropical disease caused by *Haemophilus ducreyi*. It causes painful genital ulcers associated with unilateral, painful inguinal lymph node enlargement. The ulcers typically have a sharply defined, ragged, undermined border.

Lymphogranuloma venereum (LGV) is caused by *Chlamydia trachomatis*. Typically infection comprises of three stages

- stage 1: small painless pustule which later forms an ulcer
- stage 2: painful inguinal lymphadenopathy
- stage 3: proctocolitis

LGV is treated using doxycycline.

Other causes of genital ulcers

- Behcet's disease
- carcinoma
- granuloma inguinale: *Klebsiella granulomatis**

*previously called *Calymmatobacterium granulomatis*



Question 15 of 143

Next

A 12-year-old girl comes to surgery with her mother who requests more information about human papilloma virus (HPV) vaccination. Which one of the following statements regarding HPV vaccination is incorrect?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Gardasil is given in 3 doses |
| <input type="radio"/> | B. HPV is the main aetiological factor in the development of cervical cancer |
| <input type="radio"/> | C. Gardasil protects against HPV 6, 11, 16 & 18 |
| <input type="radio"/> | D. A vaccination program has been introduced for girls aged 12-13 years |
| <input checked="" type="radio"/> | E. Cervarix has the advantage over Gardasil of offering protection against genital warts |

Next question

Gardasil, rather than Cervarix, has the advantage of offering protection against genital warts.

Human papilloma virus vaccination

It has been known for a longtime that the human papilloma virus (HPV) which infects the keratinocytes of the skin and mucous membranes is carcinogenic.

There are dozens of strains of HPV. The most important to remember are:

- 6 & 11: causes genital warts
- 16 & 18: linked to a variety of cancers, most notably cervical cancer

HPV infection is linked to:

- over 99.7% of cervical cancers
- around 85% of anal cancers
- around 50% of vulval and vaginal cancers
- around 20-30% of mouth and throat cancers

It should of course be remembered that there are other risk factors important in developing cervical cancer such as smoking, combined oral contraceptive pill use and high parity.

Testing for HPV has now been integrated into the cervical cancer screening programme. If a smear is reported as borderline or mild dyskaryosis the original sample is tested for HPV

- if HPV negative the patient goes back to routine recall
- if HPV positive the patient is referred for colposcopy

Immunisation

A vaccination for HPV was introduced in the UK back in 2008. As you may remember the Department of Health initially chose Cervarix. This vaccine protected against HPV 16 & 18 but not 6 & 11. There was widespread criticism of this decision given the significant disease burden caused by genital warts. Eventually in 2012 Gardasil replaced Cervarix as the vaccine used. Gardasil protects against HPV 6, 11, 16 & 18.

Girls aged 12-13 years are offered the vaccine in the UK

- the vaccine is normally given in school
- information given to parents and available on the NHS website make it clear that the daughter may receive the vaccine against parental wishes
- to date 3 doses have been given. The second dose must be at least 1 month after the first and the third must be at least 3 months after the second

- this dosing schedule is however changing from September 2014 due to evidence that 2 spaced out doses are as effective as 3
- girls will now have the second (and final) dose between 6-24 months after the first, depending on local policy

Injection site reactions are particularly common with HPV vaccines.



Question 16 of 143

Next

A 23-year-old student returns from India and develops a febrile illness. Following investigation he is diagnosed as having *Plasmodium vivax* malaria. What is the most appropriate treatment?



<input checked="" type="radio"/>	A. Chloroquine
<input type="radio"/>	B. Atovaquone-proguanil
<input type="radio"/>	C. Quinine
<input type="radio"/>	D. Doxycycline
<input type="radio"/>	E. Artemether-lumefantrine

Next question

Non-falciparum malarias are almost always chloroquine sensitive

Malaria: non-falciparum

The most common cause of non-falciparum malaria is *Plasmodium vivax*, with *Plasmodium ovale* and *Plasmodium malariae* accounting for the other cases. *Plasmodium vivax* is often found in Central America and the Indian Subcontinent whilst *Plasmodium ovale* typically comes from Africa

Features

- general features of malaria: fever, headache, splenomegaly
- *Plasmodium vivax/ovale*: cyclical fever every 48 hours. *Plasmodium malariae*: cyclical fever every 72 hours
- *Plasmodium malariae*: is associated with nephrotic syndrome

Ovale and vivax malaria have a hypnozoite stage and may therefore relapse following treatment.

Treatment

- non-falciparum malarias are almost always chloroquine sensitive
- patients with ovale or vivax malaria should be given primaquine following acute treatment with chloroquine to destroy liver hypnozoites and prevent relapse



Question 17 of 143

Next

A 23-year-old woman comes for review. She has had recurrent genital warts for the past 4 years which have failed to respond to topical podophyllum. On one occasion she had cryotherapy but will not have it again due to local discomfort. On examination she has a large number of fleshy genital warts around her introitus. What is the most appropriate next step in treatment?



- | | |
|----------------------------------|---------------------------|
| <input type="radio"/> | A. Topical glutaraldehyde |
| <input type="radio"/> | B. Oral podophyllum |
| <input checked="" type="radio"/> | C. Topical imiquimod |
| <input type="radio"/> | D. Oral aciclovir |
| <input type="radio"/> | E. Topical salicylic acid |

Next question

Genital warts

Genital warts (also known as condylomata accuminata) are a common cause of attendance at

genitourinary clinics. They are caused by the many varieties of the human papilloma virus HPV, especially types 6 & 11. It is now well established that HPV (primarily types 16,18 & 33) predisposes to cervical cancer.

Features

- small (2 - 5 mm) fleshy protuberances which are slightly pigmented
- may bleed or itch

Management

- topical podophyllum or cryotherapy are commonly used as first-line treatments depending on the location and type of lesion. Multiple, non-keratinised warts are generally best treated with topical agents whereas solitary, keratinised warts respond better to cryotherapy
- imiquimod is a topical cream which is generally used second line
- genital warts are often resistant to treatment and recurrence is common although the majority of anogenital infections with HPV clear without intervention within 1-2 years



Question 18 of 143

Next

A 78-year-old woman develops profuse, offensive watery diarrhoea following a course of co-amoxiclav. A diagnosis of *Clostridium difficile* diarrhoea is made. On examination she is haemodynamically stable, afebrile and has no abdominal signs. What is the most appropriate first-line therapy?



<input type="radio"/>	A. Oral vancomycin for 7 days
<input checked="" type="radio"/>	B. Oral metronidazole for 10-14 days
<input type="radio"/>	C. Oral metronidazole + vancomycin for 10-14 days
<input type="radio"/>	D. Oral metronidazole for 7 days
<input type="radio"/>	E. Probiotic yoghurt for 14 days

Next question

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea
- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



Question 19 of 143

Next

A 75-year-old man asks you about the 'shingles vaccine'. Which one of the following statements regarding Zostavax is correct?



A. Requires a course of 2 injections



<input checked="" type="radio"/>	B.	Is suitable for patients who've had chickenpox
<input type="radio"/>	C.	Prevents 8 out of 10 cases of shingles
<input type="radio"/>	D.	Has not been shown to reduce the incidence of post-herpetic neuralgia
<input type="radio"/>	E.	Is given intramuscularly

Next question

Zostavax should be given regardless of whether a person has had chickenpox or shingles previously.

Herpes zoster

Shingles is an acute, unilateral, painful blistering rash caused by reactivation of the Varicella Zoster Virus (VZV).

The 'shingles vaccine'

In 2013 the NHS introduced a vaccine to boost the immunity of elderly people against herpes zoster. Some important points about the vaccine:

- will be offered to patients at the age of **70 years** (a catch-up programme will also be launched initially)
- is **live-attenuated** and given **sub-cutaneously**

As it is a live-attenuated vaccine the main contraindications are immunosuppression.

Side-effects

- injection site reactions
- less than 1 in 10,000 individuals will develop chickenpox

Management of shingles

Oral aciclovir is first-line. One of the main benefits of treatment is a reduction in the incidence of post-herpetic neuralgia.



Question 20 of 143

Next

A 19-year-old who is normally fit and well presents with a sore throat. A decision is made not to prescribe antibiotics. How long should he be advised that his illness will last on average?



- | | |
|----------------------------------|------------|
| <input type="radio"/> | A. 2 days |
| <input type="radio"/> | B. 4 days |
| <input checked="" type="radio"/> | C. 1 week |
| <input type="radio"/> | D. 10 days |
| <input type="radio"/> | E. 2 weeks |

Respiratory tract infections: NICE guidelines

NICE issued guidance in 2008 on the management of respiratory tract infection, focusing on the prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

A no antibiotic prescribing or delayed antibiotic prescribing approach is generally recommended for patients with acute otitis media, acute sore throat/acute pharyngitis/acute tonsillitis, common cold, acute rhinosinusitis or acute cough/acute bronchitis.

However, an immediate antibiotic prescribing approach may be considered for:

- children younger than 2 years with bilateral acute otitis media
- children with otorrhoea who have acute otitis media
- patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present

The Centor criteria* are as follows:

- presence of tonsillar exudate
- tender anterior cervical lymphadenopathy or lymphadenitis
- history of fever
- absence of cough

If the patient is deemed at risk of developing complications, an immediate antibiotic prescribing policy is recommended

- are systemically very unwell
- have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications)
- are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely

- are older than 65 years with acute cough and two or more of the following, or older than 80 years with acute cough and one or more of the following:
- - hospitalisation in previous year
- - type 1 or type 2 diabetes
- - history of congestive heart failure
- - current use of oral glucocorticoids

The guidelines also suggest that patients should be advised how long respiratory tract infections may last:

- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1 1/2 weeks
- acute rhinosinusitis: 2 1/2 weeks
- acute cough/acute bronchitis: 3 weeks

*if 3 or more of the criteria are present there is a 40-60% chance the sore throat is caused by Group A beta-haemolytic *Streptococcus*



Question 21 of 143

Next

A 42-year-old woman presents with pyrexia and a productive cough. Around 10 days ago she developed symptoms consistent with a flu-like illness. For around 4-5 days she was in bed with myalgia, fever and lethargy. Initially there was an improvement in her condition but over the past three days she has developed a cough productive of thick pink-yellow sputum. On examination there are scattered crackles in the right base. Her symptoms are not severe enough to warrant admission and oral amoxicillin is prescribed. Which other medication should also be given?



- | | |
|----------------------------------|-------------------|
| <input type="radio"/> | A. Aciclovir |
| <input type="radio"/> | B. Ciprofloxacin |
| <input type="radio"/> | C. Oseltamivir |
| <input checked="" type="radio"/> | D. Flucloxacillin |



E. Penicillin V

[Next question](#)

There is a high incidence of *Staphylococcus aureus* pneumonia in patients following influenza. As a result the BNF advises the co-prescription of flucloxacillin in such a situation.

Pneumonia: community-acquired

Community acquired pneumonia (CAP) may be caused by the following infectious agents:

- *Streptococcus pneumoniae* (accounts for around 80% of cases)
- *Haemophilus influenzae*
- *Staphylococcus aureus*: commonly after the 'flu
- atypical pneumonias (e.g. Due to *Mycoplasma pneumoniae*)
- viruses

Klebsiella pneumoniae is classically in alcoholics

***Streptococcus pneumoniae* (pneumococcus)** is the most common cause of community-acquired pneumonia

Characteristic features of pneumococcal pneumonia

- rapid onset
- high fever
- pleuritic chest pain
- herpes labialis

Management

CURB-65 criteria of severe pneumonia

- Confusion (abbreviated mental test score $\leq 8/10$)
- Urea > 7 mmol/L
- Respiratory rate ≥ 30 / min
- BP: systolic ≤ 90 or diastolic ≤ 60 mmHg
- age ≥ 65 years

Patients with 3 or more (out of 5) of the above criteria are regarded as having a severe pneumonia

The British Thoracic Society published guidelines in 2009:

- low or moderate severity CAP: oral amoxicillin. A macrolide should be added for patients admitted to hospital
- high severity CAP: intravenous co-amoxiclav + clarithromycin OR cefuroxime + clarithromycin OR cefotaxime + clarithromycin
- the current BNF has slightly different recommendations for high severity CAP: intravenous benzylpenicillin + clarithromycin OR benzylpenicillin + doxycycline. For 'life-threatening' infections the BNF recommends the same as the BTS guidelines for high-severity CAP



Question 22 of 143

Next

You have been asked by the Practice Manager to help coordinate the introduction of the shingles vaccine (Zostavax) to the surgery. Which one of the following groups should be offered the vaccine?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. All adults aged 70-79 years who've never had chickenpox |
| <input type="radio"/> | B. All adults aged 70 years who've had chickenpox |
| <input checked="" type="radio"/> | C. All adults aged 70 years |
| <input type="radio"/> | D. Healthcare workers who've never had chickenpox |
| <input type="radio"/> | E. Immunosuppressed patients who've never had chickenpox |

Next question

Serologic surveys demonstrate extremely high levels of chickenpox exposure in adults over the age of 60 years. All 70 year olds patients should therefore be offered the vaccine regardless of their recollection as to whether

Herpes zoster

Shingles is an acute, unilateral, painful blistering rash caused by reactivation of the Varicella Zoster

Virus (VZV).

The 'shingles vaccine'

In 2013 the NHS introduced a vaccine to boost the immunity of elderly people against herpes zoster. Some important points about the vaccine:

- will be offered to patients at the age of **70 years** (a catch-up programme will also be launched initially)
- is **live-attenuated** and given **sub-cutaneously**

As it is a live-attenuated vaccine the main contraindications are immunosuppression.

Side-effects

- injection site reactions
- less than 1 in 10,000 individuals will develop chickenpox

Management of shingles

Oral aciclovir is first-line. One of the main benefits of treatment is a reduction in the incidence of post-herpetic neuralgia.



Question 23 of 143

[Next](#)

A 25-year-old woman is diagnosed with a urinary tract infection. She has a past history of epilepsy and is currently taking sodium valproate. Which one of the following antibiotics should be avoided if possible?



- | | |
|-----------------------|-------------------|
| <input type="radio"/> | A. Co-amoxiclav |
| <input type="radio"/> | B. Nitrofurantoin |
| <input type="radio"/> | C. Cefixime |
| <input type="radio"/> | D. Trimethoprim |



E. Ciprofloxacin

Next question

Whilst many antibiotics can lower the seizure threshold, this effect is seen particularly with quinolones. The BNF advises that quinolones 'should be used with caution in patients with a history of epilepsy, or conditions that predispose to seizures'

Quinolones

Quinolones are a group of antibiotics which work by inhibiting DNA synthesis and are bactericidal in nature. Examples include:

- ciprofloxacin
- levofloxacin

Mechanism of action

- inhibit topoisomeras II (DNA gyrase) and topoisomerase IV

Adverse effects

- lower seizure threshold in patients with epilepsy
- tendon damage (including rupture) - the risk is increased in patients also taking steroids
- cartilage damage has been demonstrated in animal models and for this reason quinolones are generally avoided (but not necessarily contraindicated) in children



Question 24 of 143

Next

A 72-year-old woman is reviewed following a course of oral flucloxacillin for right lower limb cellulitis. The local protocol suggest oral clindamycin should be used next-line. Which one of the following side-effects is it most important to warn her about?



A. Heartburn or indigestion

- | | |
|----------------------------------|---|
| <input type="radio"/> | B. Jaundice |
| <input type="radio"/> | C. Sore throat, bruising or lethargy |
| <input type="radio"/> | D. Avoid any food or drink containing alcohol |
| <input checked="" type="radio"/> | E. Diarrhoea |

Next question

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea
- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



Question 25 of 143

Next

A newly qualified staff nurse at the local hospital undergoes vaccination against hepatitis B. The following results are obtained three months after completion of the primary course:

Anti-HBs	10 - 100 mIU/ml
----------	-----------------

What is the most appropriate course of action?



- ☐ A. Repeat course (i.e. 3 doses) of hepatitis B vaccine
- ☐ B. Repeat anti-HBs level in three months time
- ☐ C. Give a course of hepatitis B immune globulin (HBIG) + one further dose of hepatitis B vaccine
- ☒ D. Give one further dose of hepatitis B vaccine
- ☐ E. Do a HIV test

Next question

Hepatitis B

Hepatitis B is a double-stranded DNA hepadnavirus and is spread through exposure to infected blood or body fluids, including vertical transmission from mother to child. The incubation period is 6-20 weeks.

The features of hepatitis B include fever, jaundice and elevated liver transaminases.

Complications of hepatitis B infection

- chronic hepatitis (5-10%)
- fulminant liver failure (1%)
- hepatocellular carcinoma
- glomerulonephritis
- polyarteritis nodosa
- cryoglobulinaemia

Immunisation against hepatitis B (please see the Greenbook link for more details)

- contains HBsAg adsorbed onto aluminium hydroxide adjuvant and is prepared from yeast cells using recombinant DNA technology
- most schedules give 3 doses of the vaccine with a recommendation for a one-off booster 5 years following the initial primary vaccination
- at risk groups who should be vaccinated include: healthcare workers, intravenous drug users, sex workers, close family contacts of an individual with hepatitis B, individuals receiving blood transfusions regularly, chronic kidney disease patients who may soon require renal replacement therapy, prisoners, chronic liver disease patients
- around 10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine. Risk factors include age over 40 years, obesity, smoking, alcohol excess and immunosuppression
- testing for anti-HBs is only recommended for those at risk of occupational exposure (i.e. Healthcare workers) and patients with chronic kidney disease. In these patients anti-HBs levels should be checked 1-4 months after primary immunisation
- the table below shows how to interpret anti-HBs levels:

Anti-HBs level (mIU/ml)	Response
> 100	Indicates adequate response, no further testing required. Should still receive booster at 5 years
10 - 100	Suboptimal response - one additional vaccine dose should be given. If immunocompetent no further testing is required
< 10	Non-responder. Test for current or past infection. Give further vaccine course (i.e. 3 doses again) with testing following. If still fails to respond then HBIG would be required for protection if exposed to the virus

Management of hepatitis B

- pegylated interferon-alpha used to be the only treatment available. It reduces viral replication in up to 30% of chronic carriers. A better response is predicted by being female, < 50 years old, low HBV DNA levels, non-Asian, HIV negative, high degree of inflammation on liver biopsy

- whilst NICE still advocate the use of pegylated interferon first-line other antiviral medications are increasingly used with an aim to suppress viral replication (not in a dissimilar way to treating HIV patients)
- examples include tenofovir and entecavir



Question 26 of 143

Next

Which one of the following statements regarding the injectable influenza vaccine is correct?



<input type="radio"/>	A. It should be stored at room temperature
<input type="radio"/>	B. It is 95% effective at preventing influenza
<input type="radio"/>	C. Fever and malaise occur in approximately 60% of patients for 1-2 days following the injection
<input type="radio"/>	D. It should not be given to patients who are immunosuppressed e.g. receiving chemotherapy
<input checked="" type="radio"/>	E. Contraindications include hypersensitivity to egg protein



Next question

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine


- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



Question 27 of 143

Next

A 72-year-old woman is reviewed with a 3 day history of dysuria and suprapubic pain. Over the past 24 hours she has been feeling increasingly hot and unwell. Which one of the following features would indicate 'red flag' sepsis?

	<input type="radio"/>	A. Blood pressure 98/62 mmHg
	<input type="radio"/>	B. Flank pain
	<input type="radio"/>	C. Respiratory rate 24/min
	<input type="radio"/>	D. Oxygen saturations 93%
	<input type="radio"/>	E. Heart rate 136/min

Next question

Over the past decade there has been a strive to improve the management of septic patients in secondary care. This effort is now starting to focus on primary care and is looking to improve the recognition and early management of these patients.

Sepsis: classification

Sepsis is increasingly recognised as important cause of mortality in the UK and there has been increasing efforts recently to improve the care of patients who present with sepsis.

Definitions and diagnosis

Systemic inflammatory response syndrome (SIRS)

- at least 2 of the following
- body temperature less than 36°C or greater than 38.3°C
- heart rate greater than 90/min
- respiratory rate greater than 20 breaths per minute
- blood glucose > 7.7mmol/L in the absence of known diabetes
- white cell count less than 4 or greater than 12

SIRS may occur as a result of an infection (bacterial, viral or fungal) or in response to a non-infective inflammatory cause, for example burns or pancreatitis. Sepsis is defined as SIRS in response to a proven or presumed infection. The mortality rate of sepsis is around 10%.

Recently the Sepsis Trust have introduced the concept of 'red flag' sepsis. They recommend starting the 'sepsis six' if any 1 of the following are present:

Red flag signs:

- systolic blood pressure < 90mmHg or > 40mmHg fall from baseline
- mean arterial pressure < 65mmHg
- heart rate > 131 per minute
- respiratory rate > 25 per minute*
- AVPU = V, P or U*

They also detail a number of laboratory findings which indicate severe sepsis. These are detail at the bottom of the page in the appendix.

Severe sepsis

- sepsis with end organ dysfunction or hypoperfusion (indicated by hypotension, lactic acidosis or decreased urine output or others)

Septic shock

- severe sepsis with persistently low blood pressure which has failed to respond to the administration of intravenous fluids.

Management

Clearly the underlying cause of the patients sepsis needs to be identified and treated and the patient supported regardless of the cause or severity. If however any of the red flags are present the 'sepsis six' should be started straight away:

- 1. Administer high flow oxygen.
- 2. Take blood cultures
- 3. Give broad spectrum antibiotics
- 4. Give intravenous fluid challenges
- 5. Measure serum lactate and haemoglobin
- 6. Measure accurate hourly urine output

Appendix

Laboratory and other findings indicating severe sepsis:

- PaO₂/ FiO₂ ratio < 300 (mmHg) or < 39.9 (kPa)

- Lactate > 2.0mmol/L
- Bilateral pulmonary infiltrates AND new need for supplemental oxygen to maintain oxygen saturations > 90%
- Creatinine > 176.8 μ mol/L
- INR > 1.5
- aPTT > 60s
- Platelet count < 100 x10⁹/L
- Bilirubin > 34.2 μ mol/L
- Urine output < 0.5mL/kg for two consecutive hours



Question 28 of 143

Next

A 14-month-old boy is brought to surgery. Mum says he has been off his food for the past few days and is a bit 'niggly'. Clinical examination reveals the following:



© Image used on license from [DermNet NZ](#)



His temperature is 37.8degC. What is the most likely diagnosis?



A. Fifth disease

- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | B. Erythema multiforme |
| <input checked="" type="radio"/> | C. Kawasaki disease |
| <input checked="" type="radio"/> | D. Hand, foot and mouth disease |
| <input type="radio"/> | E. Measles |

Next question

Hand, foot and mouth disease

Hand, foot and mouth disease is a self-limiting condition affecting children. It is caused by the intestinal viruses of the Picornaviridae family (most commonly coxsackie A16 and enterovirus 71). It is very contagious and typically occurs in outbreaks at nursery

Clinical features

- mild systemic upset: sore throat, fever
- oral ulcers
- followed later by vesicles on the palms and soles of the feet



© Image used on license from [DermNet NZ](#)





© Image used on license from [DermNet NZ](#)



Management

- general advice about hydration and analgesia
- reassurance no link to disease in cattle
- children do not need to be excluded from school*

*The HPA recommends that children who are unwell should be kept off school until they feel better. They also advise that you contact them if you suspect that there may be a large outbreak.



Question 29 of 143

Next

A 30-year-old man comes to surgery. He has been handed a slip from an ex-girlfriend stating she has tested positive for *Chlamydia*. He last slept with her 2 months ago. He has no symptoms of note, in particular no dysuria or discharge. What is the most appropriate management?



A. Reassure symptoms would have presented by now

- | | |
|------------------------------------|--|
| <input type="radio"/> | B. Offer antibiotic therapy |
| ✓ <input checked="" type="radio"/> | C. Offer <i>Chlamydia</i> testing and antibiotic treatment immediately without waiting for the results |
| <input type="radio"/> | D. Offer <i>Chlamydia</i> testing and antibiotic treatment if positive |
| <input type="radio"/> | E. Notify public health |

Next question

Treatment is given on the basis of exposure to infection rather than proven infection

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

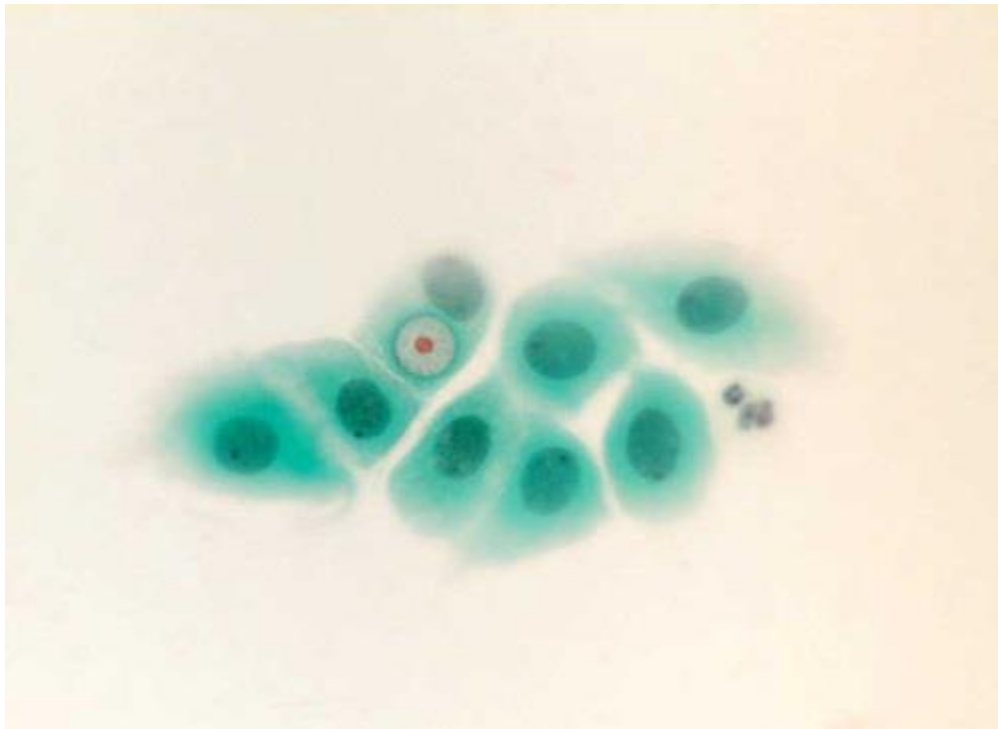
Investigation

- traditional cell culture is no longer widely used

- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



© Image used on license from PathoPic

Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline

- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

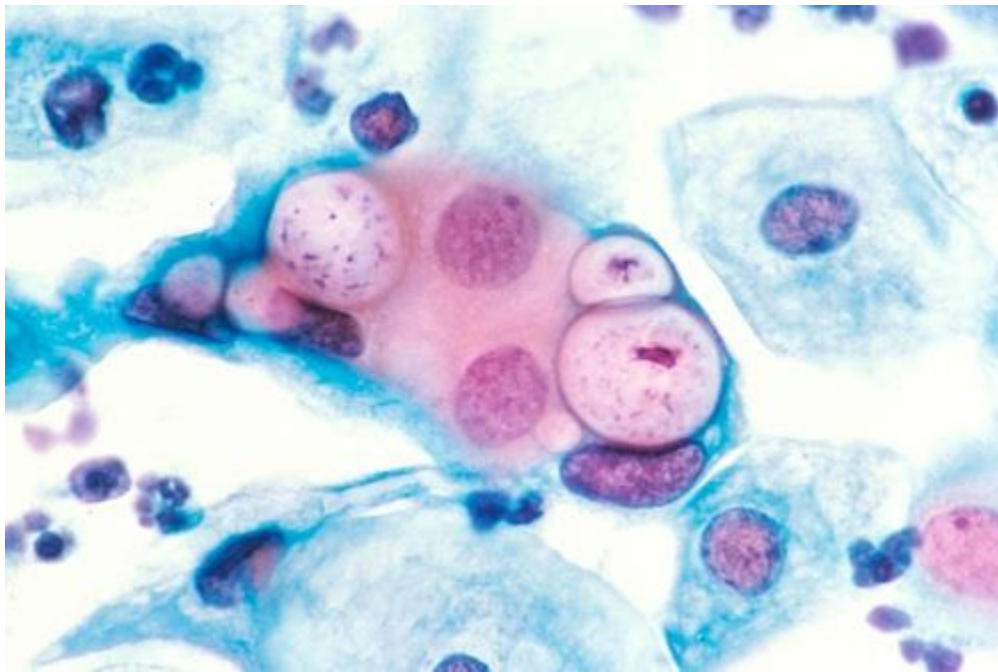


Image sourced from [Wikipedia](#)© Image used on license from PathoPic

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



Question 30 of 143

Next

A 44-year-old farmer presents with headache, fever and muscle aches. He initially thought he had a bad cold but his symptoms have got progressively worse over the past week. During the review of

systems he reports nausea and a decreased urine output. On examination his temperature is 38.2°C, pulse 102 / min and his chest is clear. Subconjunctival haemorrhages are noted but there is no evidence of jaundice. What is the most likely diagnosis?

-  ☐ A. Mycoplasma pneumonia
- ☐ B. Lyme disease
- ☐ C. Legionella pneumonia
- ☐ D. Listeria
-  ☒ E. Leptospirosis

Next question

The main clue in the question is the patients occupation. Mycoplasma and Legionella are less likely due to the absence of chest symptoms and signs. Liver failure is seen in only 10% of patients with leptospirosis..

Leptospirosis

Also known as Weil's disease*, leptospirosis is commonly seen in questions referring to sewage workers, farmers, vets or people who work in abattoir. It is caused by the spirochaete *Leptospira interrogans* (serogroup L icterohaemorrhagiae), classically being spread by contact with infected rat urine. Weil's disease should always be considered in high-risk patients with hepatorenal failure

Features

- fever
- flu-like symptoms
- renal failure (seen in 50% of patients)
- jaundice
- subconjunctival haemorrhage
- headache, may herald the onset of meningitis

Management

- high-dose benzylpenicillin or doxycycline

*the term Weil's disease is sometimes reserved for the most severe 10% of cases that are associated with jaundice



Question 31 of 143

Next

A 54-year-old woman who is currently receiving chemotherapy for breast cancer presents for advice. Her granddaughter has developed chickenpox, with the pox first appearing yesterday whilst she was looking after her. The patient has never had chickenpox herself and is concerned about developing it, although she is asymptomatic at the current time. What is the most appropriate management?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Arrange varicella zoster immunoglobulin |
| <input type="radio"/> | B. Prescribe oral aciclovir |
| <input type="radio"/> | C. Admit for intravenous aciclovir |
| <input type="radio"/> | D. Reassure the patient she is not at an increased risk |
| <input type="radio"/> | E. Arrange immunisation against varicella |

Next question

This patient is immunocompromised secondary to the chemotherapy and is therefore at risk of a severe varicella infection. She should therefore be given varicella zoster immunoglobulin.

Chickenpox

Chickenpox is caused by primary infection with varicella zoster virus. Shingles is reactivation of dormant virus in dorsal root ganglion

Chickenpox is highly infectious

- spread via the respiratory route
- can be caught from someone with shingles
- infectivity = 4 days before rash, until 5 days after the rash first appeared*
- incubation period = 10-21 days

Clinical features (tend to be more severe in older children/adults)

- fever initially
- itchy, rash starting on head/trunk before spreading. Initially macular then papular then vesicular
- systemic upset is usually mild

Management is supportive

- keep cool, trim nails
- calamine lotion
- school exclusion: current HPA advice is 5 days from start of skin eruption. They also state 'Traditionally children have been excluded until all lesions are crusted. However, transmission has never been reported beyond the fifth day of the rash.'
- immunocompromised patients and newborns with peripartum exposure should receive varicella zoster immunoglobulin (VZIG). If chickenpox develops then IV aciclovir should be considered

A common complication is secondary bacterial infection of the lesions. Rare complications include

- pneumonia
- encephalitis (cerebellar involvement may be seen)
- disseminated haemorrhagic chickenpox
- arthritis, nephritis and pancreatitis may very rarely be seen

*it was traditionally taught that patients were infective until all lesions had scabbed over



Question 32 of 143

Next

You are asked to attend a meeting at a local nursing home. There is currently an increased incidence of MRSA in the patients and a strategy is being drawn up to tackle this. What is the most effective single step to reduce the incidence of MRSA?



A. The use of personal protective equipment for staff including gloves and aprons



<input checked="" type="radio"/>	B.	Hand hygiene
<input type="radio"/>	C.	Screening patients for MRSA on admission
<input type="radio"/>	D.	Cohort nursing
<input type="radio"/>	E.	Limiting the number of visitors

Next question

Whilst tackling MRSA requires a multi-pronged approach the evidence base demonstrates that hand hygiene is the single most important step

MRSA

Methicillin-resistant *Staphylococcus aureus* (MRSA) was one of the first organisms which highlighted the dangers of hospital-acquired infections.

Who should be screened for MRSA?

- all patients awaiting elective admissions (exceptions include day patients having terminations of pregnancy and ophthalmic surgery. Patients admitted to mental health trusts are also excluded)
- from 2011 all emergency admissions will be screened

How should a patient be screened for MRSA?

- nasal swab and skin lesions or wounds
- the swab should be wiped around the inside rim of a patient's nose for 5 seconds
- the microbiology form must be labelled 'MRSA screen'

Suppression of MRSA from a carrier once identified

- nose: mupirocin 2% in white soft paraffin, tds for 5 days
- skin: chlorhexidine gluconate, od for 5 days. Apply all over but particularly to the axilla, groin and perineum

The following antibiotics are commonly used in the treatment of MRSA infections:

- vancomycin
- teicoplanin
- linezolid

Some strains may be sensitive to the antibiotics listed below but they should not generally be used alone because resistance may develop:

- rifampicin
- macrolides
- tetracyclines
- aminoglycosides
- clindamycin

Relatively new antibiotics such as linezolid, quinupristin/dalfopristin combinations and tigecycline have activity against MRSA but should be reserved for resistant cases



Question 33 of 143

Next

The 50-year-old carer of a man who has severe Parkinson's disease asks to have the annual influenza vaccine. She has no past medical history of note. What is the most appropriate advice?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. All carers should receive the flu-vaccine |
| <input type="radio"/> | B. She can only receive the influenza vaccine if he cannot receive it for whatever reason |
| <input type="radio"/> | C. She is not eligible to receive the vaccine |
| <input checked="" type="radio"/> | D. She can receive the vaccine if the man's welfare may be at risk if she becomes ill |
| <input type="radio"/> | E. She is not eligible to receive the vaccine but should present for antiviral drugs if she develops flu-like symptoms |

Next question

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding

- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days

- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



Question 34 of 143

Next

A 23-year-old man develops watery diarrhoea whilst travelling in Egypt.
Which one of the following is the most likely responsible organism?

<input type="radio"/>	A. <i>Salmonella</i>
<input type="radio"/>	B. <i>Shigella</i>
<input type="radio"/>	C. <i>Campylobacter</i>
<input checked="" type="radio"/>	D. <i>Escherichia coli</i>
<input type="radio"/>	E. <i>Bacillus cereus</i>



Next question

E. coli is the most common cause of travellers' diarrhoea

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea,

vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none">• vomiting within 6 hours, stereotypically due to rice• diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*

- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



Question 35 of 143

Next

A 62-year-old patient with type 2 diabetes mellitus presents with a 'rash' on his left shin. This has grown in size over the past two days and is now a painful, hot, erythematous area on his anterior left shin spreading around to the back of the leg. He is systemically well and a decision is made to give oral treatment. He has a past history of penicillin allergy. What is the most appropriate antibiotic to give?



<input type="radio"/>	A. Ciprofloxacin
<input type="radio"/>	B. Cefaclor
<input type="radio"/>	C. Flucloxacillin
<input type="radio"/>	D. Vancomycin
<input checked="" type="radio"/>	E. Clarithromycin



Next question

Cellulitis

Cellulitis is a term used to describe an inflammation of the skin and subcutaneous tissues, typically due to infection by *Streptococcus pyogenes* or *Staphylococcus aureus*.

Features

- commonly occurs on the shins
- erythema, pain, swelling
- there may be some associated systemic upset such as fever

Management

The BNF recommends flucloxacillin as first-line treatment for mild/moderate cellulitis. Clarithromycin or clindamycin is recommended in patients allergic to penicillin.

Many local protocols now suggest the use of oral clindamycin in patients who have failed to respond to flucloxacillin.

Severe cellulitis should be treated with intravenous benzylpenicillin + flucloxacillin.



© Image used on license from [DermNet NZ](#)



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Next

What is the most appropriate antibiotic to treat uncomplicated *Chlamydia* infection in a 21-year-old female who is not pregnant?

- | | |
|----------------------------------|------------------|
| <input type="radio"/> | A. Erythromycin |
| <input type="radio"/> | B. Ciprofloxacin |
| <input type="radio"/> | C. Metronidazole |
| <input type="radio"/> | D. Cefixime |
| <input checked="" type="radio"/> | E. Azithromycin |

Next question

Chlamydia - treat with azithromycin or doxycycline

The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline.

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

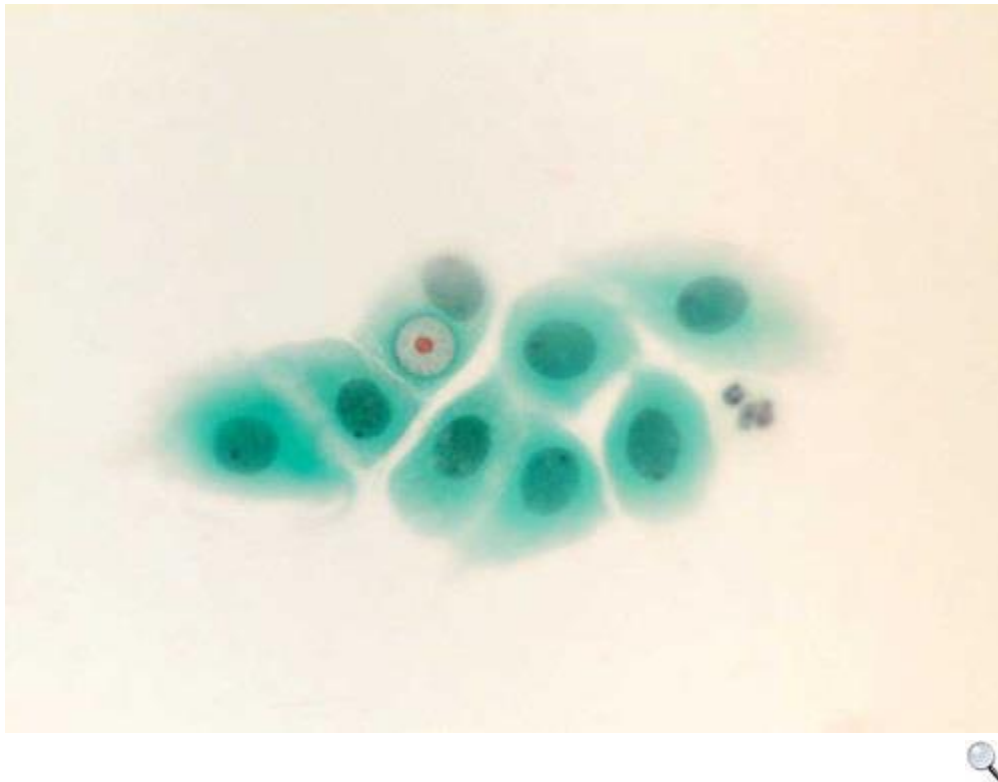
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

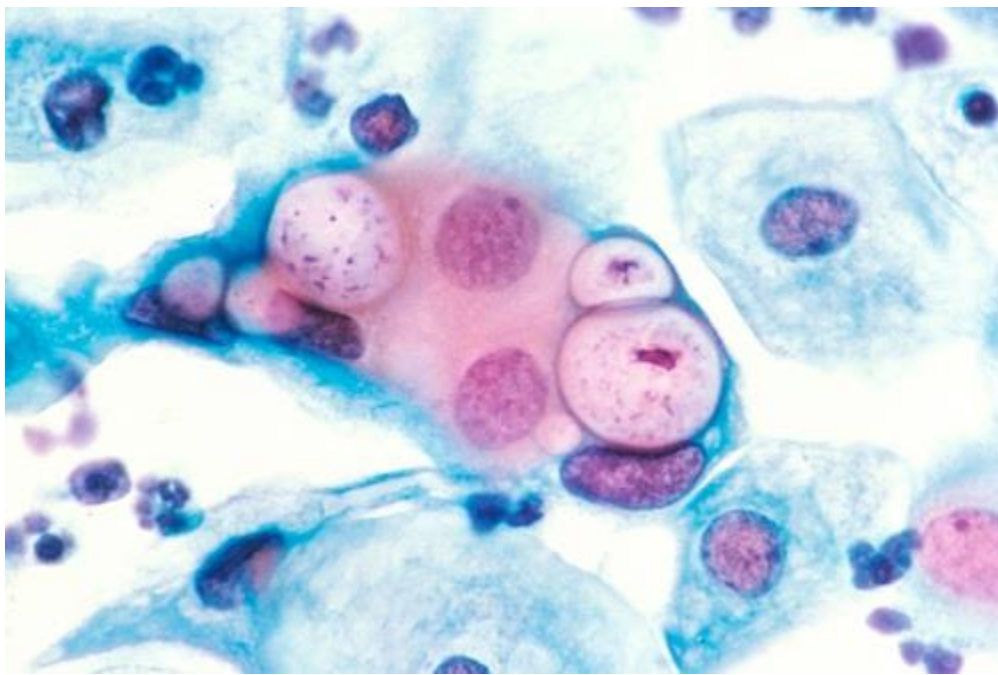


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E

1 / 3

Theme: Malaria: prophylaxis

- A. Quinine
- B. Mefloquine
- C. Atovaquone + proguanil
- D. Doxycycline
- E. Proguanil
- F. Artemether + lumefantrine
- G. Primaquine

For each one of the following statements, select the type of malaria prophylaxis from the list of options

37. Is associated with photosensitivity

 You answered Quinine

The correct answer is Doxycycline

38. Should be avoided if the patient has a history of depression

 Mefloquine

39. Is taken weekly

 You answered Primaquine

The correct answer is Mefloquine

[Next question](#)

Malaria: prophylaxis

There are around 1,500-2,000 cases each year of malaria in patients returning from endemic countries. The majority of these cases (around 75%) are caused by the potentially fatal *Plasmodium falciparum* protozoa. The majority of patients who develop malaria did not take prophylaxis. It should also be remembered that UK citizens who originate from malaria endemic areas quickly lose their innate immunity.

Up-to-date charts with recommended regimes for malarial zones should be consulted prior to prescribing

Drug	Side-effects + notes	Time to begin before travel	Time to end after travel
Atovaquone + proguanil (Malarone)	GI upset	1 - 2 days	7 days
Chloroquine	Headache Contraindicated in epilepsy Taken weekly	1 week	4 weeks
Doxycycline	Photosensitivity Oesophagitis	1 - 2 days	4 weeks
Mefloquine (Lariam)	Dizziness Neuropsychiatric disturbance Contraindicated in epilepsy Taken weekly	2 - 3 weeks	4 weeks
Proguanil (Paludrine)		1 week	4 weeks
Proguanil + chloroquine	See above	1 week	4 weeks

Pregnant women should be advised to avoid travelling to regions where malaria is endemic. Diagnosis can also be difficult as parasites may not be detectable in the blood film due to placental sequestration. However, if travel cannot be avoided:

- chloroquine can be taken
- proguanil: folate supplementation (5mg od) should be given

- Malarone (atovaquone + proguanil): the BNF advises to avoid these drugs unless essential. If taken then folate supplementation should be given
- mefloquine: caution advised
- doxycycline is contraindicated

It is again advisable to avoid travel to malaria endemic regions with children if avoidable. However, if travel is essential then children should take malarial prophylaxis as they are more at risk of serious complications.

- diethyltoluamide (DEET) 20-50% can be used in children over 2 months of age
- doxycycline is only licensed in the UK for children over the age of 12 years



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Next

Patients with each of the following conditions should be vaccinated against pneumococcus. Which group of patients should have a booster vaccination every 5 years?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Those with chronic obstructive pulmonary disease |
| <input checked="" type="radio"/> | B. Those with chronic kidney disease |
| <input type="radio"/> | C. Those with heart failure |
| <input type="radio"/> | D. Alcoholics who have liver cirrhosis |
| <input type="radio"/> | E. Those with HIV |

Next question

Pneumococcal vaccine - usually a one-off but every 5 years if splenectomy or CKD

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Pneumococcal vaccine

There are two type of pneumococcal vaccine currently in use:

- pneumococcal conjugate vaccine (PCV)
- pneumococcal polysaccharide vaccine (PPV)

The PCV is given to children as part of their routine immunisations (at 2, 4 and 13 months).

The PPV is offered to all adults over the age of 65 years, to patients with chronic conditions such as COPD and to those who have had a splenectomy (see below).

Groups who should be vaccinated:

- asplenia or splenic dysfunction
- chronic respiratory disease: COPD, bronchiectasis, cystic fibrosis, interstitial lung disease. Asthma is only included if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'
- chronic heart disease: ischaemic heart disease if requiring medication or follow-up, heart failure, congenital heart disease. Controlled hypertension is not an indication for vaccination
- chronic kidney disease
- chronic liver disease: including cirrhosis and chronic hepatitis
- diabetes mellitus if requiring medication
- immunosuppression (either due to disease or treatment). This includes patients with any stage of HIV infection
- cochlear implants
- patients with cerebrospinal fluid leaks



Adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years.



Question 41 of 143

Next

Which one of the following statements regarding malaria cases seen in the UK is true?

-  ☐ A. UK citizens who originate from malaria endemic areas generally have high levels of immunity
- ☐ B. Around 100-200 cases are seen each year in the UK
- ☐ C. The majority of patient who develop malaria took appropriate prophylaxis
- ☐ D. Malaria is now uncommon in sub-Saharan Africa
-  ☒ E. The majority of cases are caused by *Plasmodium falciparum*

Next question

Malaria: prophylaxis

There are around 1,500-2,000 cases each year of malaria in patients returning from endemic countries. The majority of these cases (around 75%) are caused by the potentially fatal *Plasmodium falciparum* protozoa. The majority of patients who develop malaria did not take prophylaxis. It should also be remembered that UK citizens who originate from malaria endemic areas quickly lose their innate immunity.

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	Neuropsychiatric disturbance Contraindicated in epilepsy Taken weekly		
Proguanil (Paludrine)		1 week	4 weeks
Proguanil + chloroquine	See above	1 week	4 weeks

Pregnant women should be advised to avoid travelling to regions where malaria is endemic.

Diagnosis can also be difficult as parasites may not be detectable in the blood film due to placental sequestration. However, if travel cannot be avoided:

- chloroquine can be taken
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- Malarone (atovaquone + proguanil): the BNF advises to avoid these drugs unless essential.
If taken then folate supplementation should be given
- mefloquine: caution advised
- doxycycline is contraindicated

It is again advisable to avoid travel to malaria endemic regions with children if avoidable. However, if travel is essential then children should take malarial prophylaxis as they are more at risk of serious complications.

- diethyltoluamide (DEET) 20-50% can be used in children over 2 months of age
- doxycycline is only licensed in the UK for children over the age of 12 years

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[Next](#)


Theme: BNF antibiotic guidelines

- A.** Clarithromycin
- B.** Trimethoprim or nitrofurantoin or amoxicillin or cephalosporin
- C.** Quinolone or trimethoprim

D.	Trimethoprim or vancomycin
E.	Amoxicillin or tetracycline or erythromycin
F.	Phenoxymethylpenicillin + flucloxacillin
G.	Flucloxacillin
H.	Amoxicillin or doxycycline or erythromycin
I.	Doxycycline
J.	Broad-spectrum cephalosporin or quinolone

For each one of the following conditions please select the antibiotic choice that best reflects current BNF guidelines:

42. Atypical pneumonia

 Clarithromycin

43. Lower urinary tract infection

 You answered Clarithromycin

The correct answer is Trimethoprim or nitrofurantoin or amoxicillin or cephalosporin

44. Should be added in the treatment of pneumonia if secondary to influenza

 You answered Clarithromycin

The correct answer is Flucloxacillin

[Next question](#)

Antibiotic guidelines

The following is based on current BNF guidelines:

Respiratory system

Condition	Recommended treatment
Exacerbations of chronic bronchitis	Amoxicillin or tetracycline or clarithromycin
Uncomplicated community-acquired pneumonia	Amoxicillin (Doxycycline or clarithromycin in penicillin allergic, add flucloxacillin if staphylococci suspected e.g. In influenza)
Pneumonia possibly caused by atypical pathogens	Clarithromycin
Hospital-acquired pneumonia	Within 5 days of admission: co-amoxiclav or cefuroxime More than 5 days after admission: piperacillin with tazobactam OR a broad-spectrum cephalosporin (e.g. ceftazidime) OR a quinolone (e.g. ciprofloxacin)

Urinary tract

Condition	Recommended treatment
Lower urinary tract infection	Trimethoprim or nitrofurantoin. Alternative: amoxicillin or cephalosporin
Acute pyelonephritis	Broad-spectrum cephalosporin or quinolone
Acute prostatitis	Quinolone or trimethoprim

Skin

Condition	Recommended treatment
Impetigo	Topical fusidic acid, oral flucloxacillin or erythromycin if widespread
Cellulitis	Flucloxacillin (clarithromycin or clindomycin if penicillin-allergic)
Erysipelas	Phenoxymethylpenicillin (erythromycin if penicillin-allergic)
Animal or human bite	Co-amoxiclav (doxycycline + metronidazole if penicillin-allergic)

Ear, nose & throat

Condition	Recommended treatment
Throat infections	Phenoxymethylpenicillin (erythromycin alone if penicillin-allergic)
Sinusitis	Amoxicillin or doxycycline or erythromycin
Otitis media	Amoxicillin (erythromycin if penicillin-allergic)
Otitis externa*	Flucloxacillin (erythromycin if penicillin-allergic)

Genital system

Condition	Recommended treatment
Gonorrhoea	Intramuscular ceftriaxone + oral azithromycin
<i>Chlamydia</i>	Doxycycline or azithromycin
Pelvic inflammatory disease	Oral ofloxacin + oral metronidazole or intramuscular ceftriaxone + oral doxycycline + oral metronidazole
Syphilis	Benzathine benzylpenicillin or doxycycline or erythromycin
Bacterial vaginosis	Oral or topical metronidazole or topical clindamycin

*a combined topical antibiotic and corticosteroid is generally used for mild/moderate cases of otitis externa



Question 45 of 143

Next

Which one of the following statements regarding the seasonal injectable influenza vaccine is true?



A. It is safe to use in patients with a history of hypersensitivity to eggs



B. It is around 75% effective in adults

<input type="radio"/>	C.	It takes around 5-7 days after immunisation before antibody levels are at protective levels
<input type="radio"/>	D.	It only protects against influenza type A
<input type="radio"/>	E.	Should not be given to patients who are HIV positive if their CD4 count is $< 200 \times 10^6/l$

Next question

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses

- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



Question 46 of 143

Next

You are planning to do search for all your adult patients who require the annual influenza vaccine. Which one of the following groups should be excluded from the register?



<input type="radio"/>	A. Patients with primary biliary cirrhosis
<input type="radio"/>	B. Patients with type 2 diabetes mellitus controlled with diet
<input checked="" type="radio"/>	C. Asthmatics controlled with salbutamol only
<input type="radio"/>	D. HIV patients
<input type="radio"/>	E. Patients with chronic kidney disease stage 3

Next question

Vaccinations for asthmatics

- salbutamol only (BTS stage 1): nothing needed
- has a steroid inhaler (BTS stages 2-4): annual influenza
- severe asthma requiring regular/long-term prednisolone (BTS stage 5): annual influenza + pneumococcal

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

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Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses

- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



Question 47 of 143

Next

You are reviewing test results. The midstream specimen of urine (MSU) from a 24-year-old woman who is 11 weeks pregnant shows bacteriuria. On discussing the result with the patient she is asymptomatic and has no dysuria, frequency or fever. What is the most appropriate management?



- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Ciprofloxacin for 7 days |
| <input type="radio"/> | B. Amoxicillin for 7 days |
| <input checked="" type="radio"/> | C. Repeat MSU |
| <input type="radio"/> | D. Trimethoprim for 3 days |
| <input type="radio"/> | E. No treatment |

Next question

Asymptomatic bacteriuria in pregnant women

- 1. repeat MSU
- 2. if confirmed treat with amoxicillin or a cephalosporin

SIGN advise that pregnant women with asymptomatic bacteriuria should have a second urine culture to confirm the result.

Urinary tract infection in adults: management

Lower urinary tract infections in non-pregnant women

- local antibiotic guidelines should be followed if available
- 2012 SIGN guidelines recommend trimethoprim or nitrofurantoin for 3 days

Pregnant women with symptomatic bacteriuria should be treated with an antibiotic for 7 days. A urine culture should be sent. For asymptomatic pregnant women:



- a urine culture should be performed routinely at the first antenatal visit
- if positive, a second urine culture should be sent to confirm the presence of bacteriuria
- SIGN recommend to treat asymptomatic bacteriuria detected during pregnancy with an antibiotic
- a 7 day course of antibiotics should be given
- a further urine culture should be sent following completion of treatment as a test of cure

For patients with sign of acute pyelonephritis hospital admission should be considered

- local antibiotic guidelines should be followed if available
- the BNF currently recommends a broad-spectrum cephalosporin or a quinolone for 10-14 days



A 31-year-old female presents to the genitourinary medicine clinic due to four fleshy, protuberant lesions on her vulva which are slightly pigmented. She has recently started a relationship with a new partner. What is the most appropriate initial management?

-  ☐ A. Oral aciclovir
-  ☒ B. Topical podophyllum
- ☐ C. Topical salicylic acid
- ☐ D. Topical aciclovir
- ☐ E. Electrocautery

[Next question](#)

Genital wart treatment

- multiple, non-keratinised warts: topical podophyllum
- solitary, keratinised warts: cryotherapy

Cryotherapy is also acceptable as an initial treatment for genital warts (see below)

Genital warts

Genital warts (also known as condylomata accuminata) are a common cause of attendance at genitourinary clinics. They are caused by the many varieties of the human papilloma virus HPV, especially types 6 & 11. It is now well established that HPV (primarily types 16,18 & 33) predisposes to cervical cancer.

Features

- small (2 - 5 mm) fleshy protuberances which are slightly pigmented
- may bleed or itch

Management

- topical podophyllum or cryotherapy are commonly used as first-line treatments depending on the location and type of lesion. Multiple, non-keratinised warts are generally best treated with topical agents whereas solitary, keratinised warts respond better to cryotherapy
- imiquimod is a topical cream which is generally used second line
- genital warts are often resistant to treatment and recurrence is common although the majority of anogenital infections with HPV clear without intervention within 1-2 years



Question 49 of 143

Next

A 21-year-old woman with persistent dysuria tests positive for *Chlamydia*. She agrees for referral to GUM for contact tracing. Who should be contacted?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. All partners from the 3 months prior to the onset of symptoms |
| <input checked="" type="radio"/> | B. All partners from the last 6 months or the most recent sexual partner |
| <input type="radio"/> | C. All partners from the last 3 months or the most recent sexual partner |
| <input type="radio"/> | D. All partners from the last 12 months or the most recent sexual partner |
| <input type="radio"/> | E. All partners from the 4 weeks prior to the onset of symptoms |

Next question

Chlamydia - partner notification:

- symptomatic men: all partners from the 4 weeks prior to the onset of symptoms
- women + asymptomatic men: all partners from the last 6 months or the most recent sexual partner

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be

remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

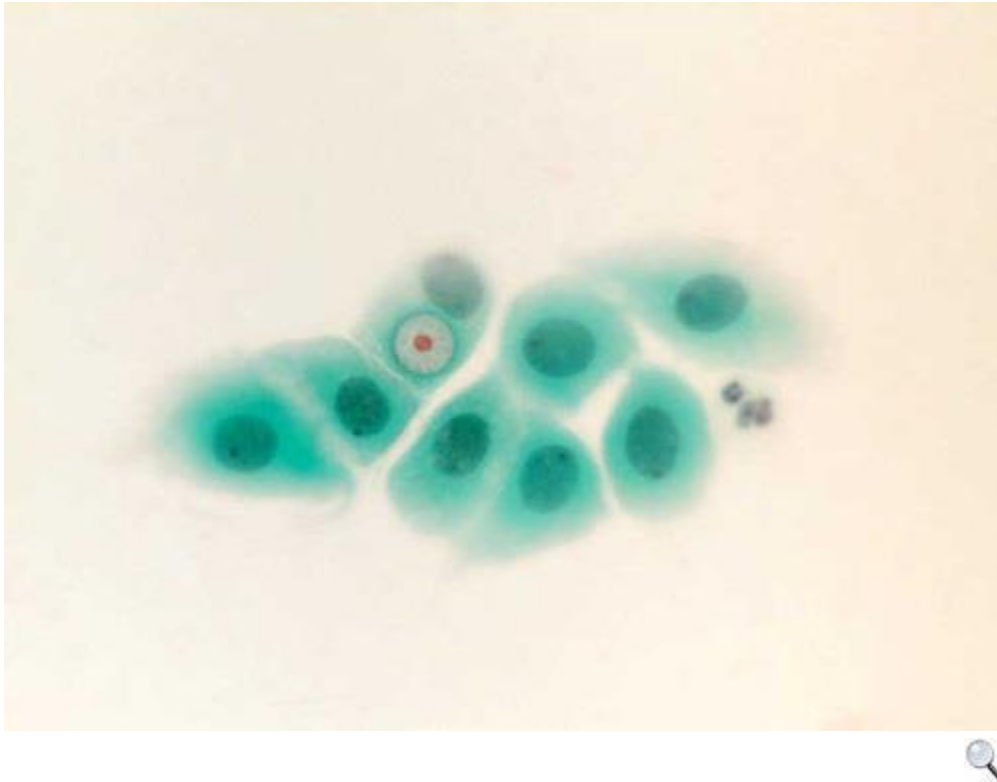
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

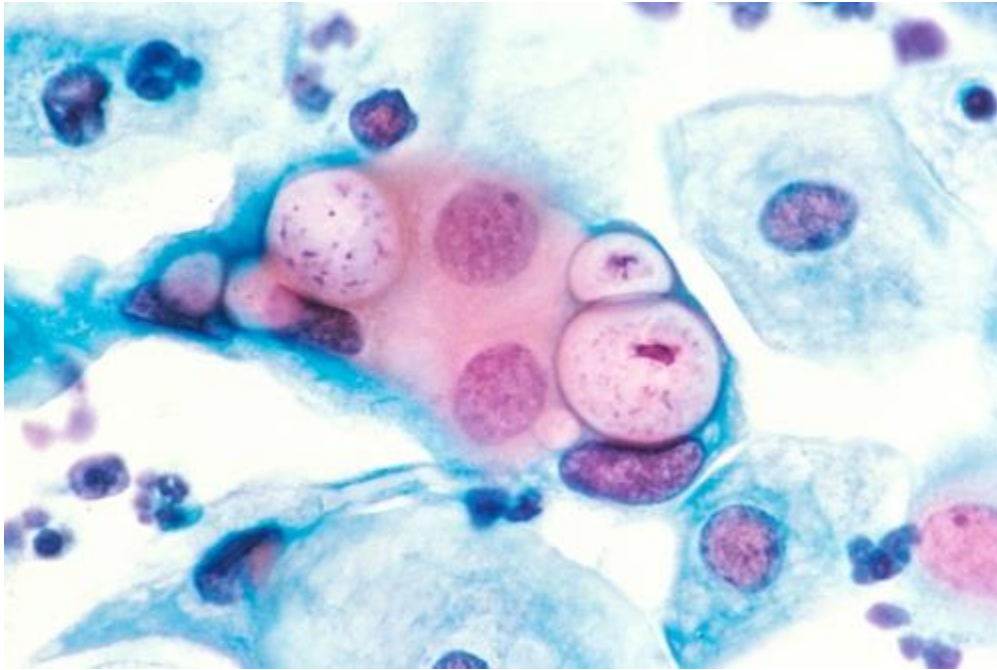


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E

0 / 3 **Question 50-52 of 143**

Next

Theme: Genital ulceration

- A.** Lymphogranuloma venereum
- B.** Behcet's disease
- C.** Herpes simplex
- D.** Chancroid
- E.** Carcinoma
- F.** Granuloma inguinale
- G.** Reiter's syndrome
- H.** Antiphospholipid syndrome
- I.** Donovanosis
- J.** Syphilis

For each of the following scenarios please select the most likely diagnosis:

50. A 27-year-old woman presents with painful genital and oral ulceration. Her past medical history includes treatment for a deep vein thrombosis three years ago.

 You answered Lymphogranuloma venereum

The correct answer is Behcet's disease

The classic triad in Behcet's is oral ulcers, genital ulcers and uveitis. Venous thromboembolism is also seen.

51. A 19-year-old woman presents with multiple painful blisters and ulcers around her labia. She has been feeling like she has the flu for the past five days. It is extremely painful when she urinates.

 You answered Lymphogranuloma venereum

The correct answer is Herpes simplex

This patient likely has a primary infection of herpes.

52. A 23-year-old man presents with an ulcer on the coronal sulcus of the penis. The ulcer is not causing him any discomfort. On examination an ulcer with an erythematous border and a clean base is found.

 You answered Lymphogranuloma venereum

The correct answer is Syphilis

[Next question](#)

STI: ulcers

Genital herpes is most often caused by the herpes simplex virus (HSV) type 2 (cold sores are usually due to HSV type 1). Primary attacks are often severe and associated with fever whilst subsequent attacks are generally less severe and localised to one site

Syphilis is a sexually transmitted infection caused by the spirochaete *Treponema pallidum*. Infection

is characterised by primary, secondary and tertiary stages. A painless ulcer (chancre) is seen in the primary stage. The incubation period= 9-90 days

Chancroid is a tropical disease caused by *Haemophilus ducreyi*. It causes painful genital ulcers associated with unilateral, painful inguinal lymph node enlargement. The ulcers typically have a sharply defined, ragged, undermined border.

Lymphogranuloma venereum (LGV) is caused by *Chlamydia trachomatis*. Typically infection comprises of three stages

- stage 1: small painless pustule which later forms an ulcer
- stage 2: painful inguinal lymphadenopathy
- stage 3: proctocolitis

LGV is treated using doxycycline.

Other causes of genital ulcers

- Behcet's disease
- carcinoma
- granuloma inguinale: *Klebsiella granulomatis**

*previously called *Calymmatobacterium granulomatis*



Question 53 of 143

Next

A 23-year-old male presents with a purulent urethral discharge. A sample of the discharge is shown to be a Gram negative diplococcus. What is the most appropriate antimicrobial therapy?



<input checked="" type="radio"/>	A. Oral ciprofloxacin for 7 days
<input type="radio"/>	B. Oral penicillin V for 7 days
<input type="radio"/>	C. Oral doxycycline for 7 days
<input type="radio"/>	D. Oral azithromycin stat dose



E. Intramuscular ceftriaxone stat dose + oral azithromycin stat dose

Next question

Cephalosporins are now the treatment of choice for Gonorrhoea

Ciprofloxacin should only be used if the organism is known to be sensitive due to increasing resistance. Penicillin, previously first-line treatment, is rarely used now due to widespread resistance.

Gonorrhoea

Gonorrhoea is caused by the Gram negative diplococcus *Neisseria gonorrhoea*. Acute infection can occur on any mucous membrane surface, typically genitourinary but also rectum and pharynx. The incubation period of gonorrhoea is 2-5 days

Features

- males: urethral discharge, dysuria
- females: cervicitis e.g. leading to vaginal discharge
- rectal and pharyngeal infection is usually asymptomatic

Local complications that may develop include urethral strictures, epididymitis and salpingitis (hence may lead to infertility). Disseminated infection may occur - see below

Management

- ciprofloxacin used to be the treatment of choice. However, there is increased resistance to ciprofloxacin and therefore cephalosporins are now used
- the 2011 British Society for Sexual Health and HIV (BASHH) guidelines recommend ceftriaxone 500 mg intramuscularly as a single dose with azithromycin 1 g oral as a single dose. The azithromycin is thought to act synergistically with ceftriaxone and is also useful for eradicating any co-existent Chlamydia infections
- if ceftriaxone is refused or contraindicated other options include cefixime 400mg PO (single dose)

Disseminated gonococcal infection (DGI) and gonococcal arthritis may also occur, with gonococcal infection being the most common cause of septic arthritis in young adults. The pathophysiology of

DGI is not fully understood but is thought to be due to haematogenous spread from mucosal infection (e.g. Asymptomatic genital infection). Initially there may be a classic triad of symptoms: tenosynovitis, migratory polyarthritis and dermatitis. Later complications include septic arthritis, endocarditis and perihepatitis (Fitz-Hugh-Curtis syndrome)

Key features of disseminated gonococcal infection

- tenosynovitis
- migratory polyarthritis
- dermatitis (lesions can be maculopapular or vesicular)



Question 54 of 143

Next

A 25-year-old man with a history of epilepsy presents for advice regarding malarial prophylaxis. Next month he plans to travel to Vietnam. His trip will take him to some of the coastal tourist destinations but he also plans to travel inland. What is the most appropriate medication to prevent him developing malaria?



- | | |
|----------------------------------|--------------------------------|
| <input type="radio"/> | A. Quinine |
| <input checked="" type="radio"/> | B. Atovaquone + proguanil |
| <input type="radio"/> | C. Mefloquine |
| <input type="radio"/> | D. Primaquine |
| <input type="radio"/> | E. Pyrimethamine + sulfadoxine |

Next question

In certain parts of South-East Asia there is widespread chloroquine resistance. Chemoprophylaxis using atovaquone + proguanil (Malarone), mefloquine (Lariam) or doxycycline is therefore recommended. Mefloquine should be avoided in this patient due to his history of epilepsy.

Malaria: prophylaxis

There are around 1,500-2,000 cases each year of malaria in patients returning from endemic countries. The majority of these cases (around 75%) are caused by the potentially

fatal *Plasmodium falciparum* protozoa. The majority of patients who develop malaria did not take prophylaxis. It should also be remembered that UK citizens who originate from malaria endemic areas quickly lose their innate immunity.

Up-to-date charts with recommended regimes for malarial zones should be consulted prior to prescribing

Drug	Side-effects + notes	Time to begin before travel	Time to end after travel
Atovaquone + proguanil (Malarone)	GI upset	1 - 2 days	7 days
Chloroquine	Headache Contraindicated in epilepsy Taken weekly	1 week	4 weeks
Doxycycline	Photosensitivity Oesophagitis	1 - 2 days	4 weeks
Mefloquine (Lariam)	Dizziness Neuropsychiatric disturbance Contraindicated in epilepsy Taken weekly	2 - 3 weeks	4 weeks
Proguanil (Paludrine)		1 week	4 weeks
Proguanil + chloroquine	See above	1 week	4 weeks

Pregnant women should be advised to avoid travelling to regions where malaria is endemic.

Diagnosis can also be difficult as parasites may not be detectable in the blood film due to placental sequestration. However, if travel cannot be avoided:

- chloroquine can be taken
- proguanil: folate supplementation (5mg od) should be given
- Malarone (atovaquone + proguanil): the BNF advises to avoid these drugs unless essential. If taken then folate supplementation should be given
- mefloquine: caution advised

- doxycycline is contraindicated

It is again advisable to avoid travel to malaria endemic regions with children if avoidable. However, if travel is essential then children should take malarial prophylaxis as they are more at risk of serious complications.

- diethyltoluamide (DEET) 20-50% can be used in children over 2 months of age
- doxycycline is only licensed in the UK for children over the age of 12 years



Question 55 of 143

Next

Which one of the following patients does not require the pneumococcal vaccine?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. 45-year-old with stable angina on beta-blockers |
| <input checked="" type="radio"/> | B. 40-year-old asthmatic using salbutamol and beclometasone |
| <input type="radio"/> | C. 41-year-old diabetic man on metformin |
| <input type="radio"/> | D. 30-year-old man with chronic kidney disease |
| <input type="radio"/> | E. A 20-year-old man who has had a splenectomy |

Next question

Asthmatic patients only require the pneumococcal vaccine if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'. Please see the link to the Green Book guidelines for more details.

As the angina patient is taking regular medication (beta-blockers) they should be offered the vaccination according to the Green Book.

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Pneumococcal vaccine

There are two type of pneumococcal vaccine currently in use:

- pneumococcal conjugate vaccine (PCV)
- pneumococcal polysaccharide vaccine (PPV)

The PCV is given to children as part of their routine immunisations (at 2, 4 and 13 months).

The PPV is offered to all adults over the age of 65 years, to patients with chronic conditions such as COPD and to those who have had a splenectomy (see below).

Groups who should be vaccinated:

- asplenia or splenic dysfunction
- chronic respiratory disease: COPD, bronchiectasis, cystic fibrosis, interstitial lung disease. Asthma is only included if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'
- chronic heart disease: ischaemic heart disease if requiring medication or follow-up, heart failure, congenital heart disease. Controlled hypertension is not an indication for vaccination
- chronic kidney disease
- chronic liver disease: including cirrhosis and chronic hepatitis
- diabetes mellitus if requiring medication
- immunosuppression (either due to disease or treatment). This includes patients with any stage of HIV infection
- cochlear implants
- patients with cerebrospinal fluid leaks

Adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years.



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Next

A 34-year-old man presents with a widespread maculopapular rash and mouth ulcers. Two months ago he reports developing a painless penile ulcer. Which one of the following organisms is most likely to be responsible?

	<input type="radio"/>	A. Lymphogranuloma venereum
	<input type="radio"/>	B. Herpes simplex virus type 2
	<input type="radio"/>	C. <i>Mycoplasma genitalium</i>
	<input type="radio"/>	D. <i>Treponema pertenue</i>
	<input checked="" type="radio"/>	E. <i>Treponema pallidum</i>

[Next question](#)

This patient has symptoms of secondary syphilis

Syphilis

Syphilis is a sexually transmitted infection caused by the spirochaete *Treponema pallidum*. Infection is characterised by primary, secondary and tertiary stages. The incubation period is between 9-90 days

Primary features

- chancre - painless ulcer at the site of sexual contact
- local non-tender lymphadenopathy
- often not seen in women (the lesion may be on the cervix)

Secondary features - occurs 6-10 weeks after primary infection

- systemic symptoms: fevers, lymphadenopathy
- rash on trunk, palms and soles
- buccal 'snail track' ulcers (30%)
- condylomata lata



© Image used on license from [DermNet NZ](#)



Classical palm lesions of secondary syphilis



© Image used on license from [DermNet NZ](#)



More generalised rash of secondary syphilis

Tertiary features

- gummas

- aortic aneurysms
- general paralysis of the insane
- tabes dorsalis

Features of congenital syphilis

- blunted upper incisor teeth
- keratitis
- saber shins
- saddle nose
- deafness



Question 57 of 143

Next

A phlebotomist gives herself a needlestick injury whilst taking blood from a patient who is known to be hepatitis B positive. The phlebotomist has just started her job and is in the process of being immunised for hepatitis B but has only had one dose to date. What is the most appropriate action to minimise her risk of contracting hepatitis B from the needle?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. No action needed, complete hepatitis B vaccination course as normal |
| <input checked="" type="radio"/> | B. Give oral ribavirin for 4 weeks |
| <input checked="" type="radio"/> | C. Give an accelerated course of the hepatitis B vaccine + hepatitis B immune globulin |
| <input type="radio"/> | D. Give hepatitis B immune globulin + oral ribavirin for 4 weeks |
| <input type="radio"/> | E. Give hepatitis B immune globulin |

Next question

As the phlebotomist has not yet completed her hepatitis B vaccination course she should be given an accelerated course of the hepatitis B vaccine + hepatitis B immune globulin.

Post-exposure prophylaxis

Hepatitis A

- Human Normal Immunoglobulin (HNIG) or hepatitis A vaccine may be used depending on the clinical situation

Hepatitis B

- HBsAg positive source: if the person exposed is a known responder to HBV vaccine then a booster dose should be given. If they are in the process of being vaccinated or are a non-responder they need to have hepatitis B immune globulin (HBIG) and the vaccine
- unknown source: for known responders the green book advises considering a booster dose of HBV vaccine. For known non-responders HBIG + vaccine should be given whilst those in the process of being vaccinated should have an accelerated course of HBV vaccine

Hepatitis C

- monthly PCR - if seroconversion then interferon +/- ribavirin

HIV

- a combination of oral antiretrovirals (e.g. Tenofovir, emtricitabine, lopinavir and ritonavir) as soon as possible (i.e. Within 1-2 hours, but may be started up to 72 hours following exposure) for 4 weeks
- serological testing at 12 weeks following completion of post-exposure prophylaxis
- reduces risk of transmission by 80%

Varicella zoster

- VZIG for IgG negative pregnant women/immunosuppressed

Estimates of transmission risk for single needlestick injury

Hepatitis B	20-30%
Hepatitis C	0.5-2%

HIV	0.3%
-----	------



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Next

A 22-year-old man presents with fatigue and a persistently sore throat for the past two weeks. On examination his temperature is 37.8°C, pulse 78/min, there is widespread cervical lymphadenopathy and evidence of palatal petechiae. Given the likely diagnosis, which one of the following complications is he at risk from?


☐

A. Subacute sclerosing panencephalitis


☒

B. Splenic rupture

☐

C. Iron-deficiency anaemia

☐

D. Encephalitis

☐

E. Giant cell pneumonia

Next question

Infectious mononucleosis

Infectious mononucleosis (glandular fever) is caused by the Epstein-Barr virus (also known as human herpesvirus 4, HHV-4). It is most common in adolescents and young adults.

Features

- sore throat
- lymphadenopathy
- pyrexia
- malaise, anorexia, headache
- palatal petechiae

- splenomegaly - occurs in around 50% of patients and may rarely predispose to splenic rupture
- hepatitis
- presence of 50% lymphocytes with at least 10% atypical lymphocytes
- haemolytic anaemia secondary to cold agglutins (IgM)
- a maculopapular, pruritic rash develops in around 99% of patients who take ampicillin/amoxicillin whilst they have infectious mononucleosis

Diagnosis

- heterophil antibody test (Monospot test)

Management is supportive and includes:

- rest during the early stages, drink plenty of fluid, avoid alcohol
- simple analgesia for any aches or pains
- consensus guidance in the UK is to avoid playing contact sports for 8 weeks after having glandular fever to reduce the risk of splenic rupture



Question 59 of 143

Next

Both the National *Chlamydia* Screening Programme and SIGN guidelines support the screening of asymptomatic patients for *Chlamydia*. Which age group should be targeted?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Sexually active patients aged 16-30 years |
| <input type="radio"/> | B. Sexually active patients aged 15-19 years |
| <input checked="" type="radio"/> | C. Sexually active patients aged 15-24 years |
| <input type="radio"/> | D. Sexually active patients aged 16-45 years |
| <input type="radio"/> | E. Sexually active patients aged 13-17 years |

Next question

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

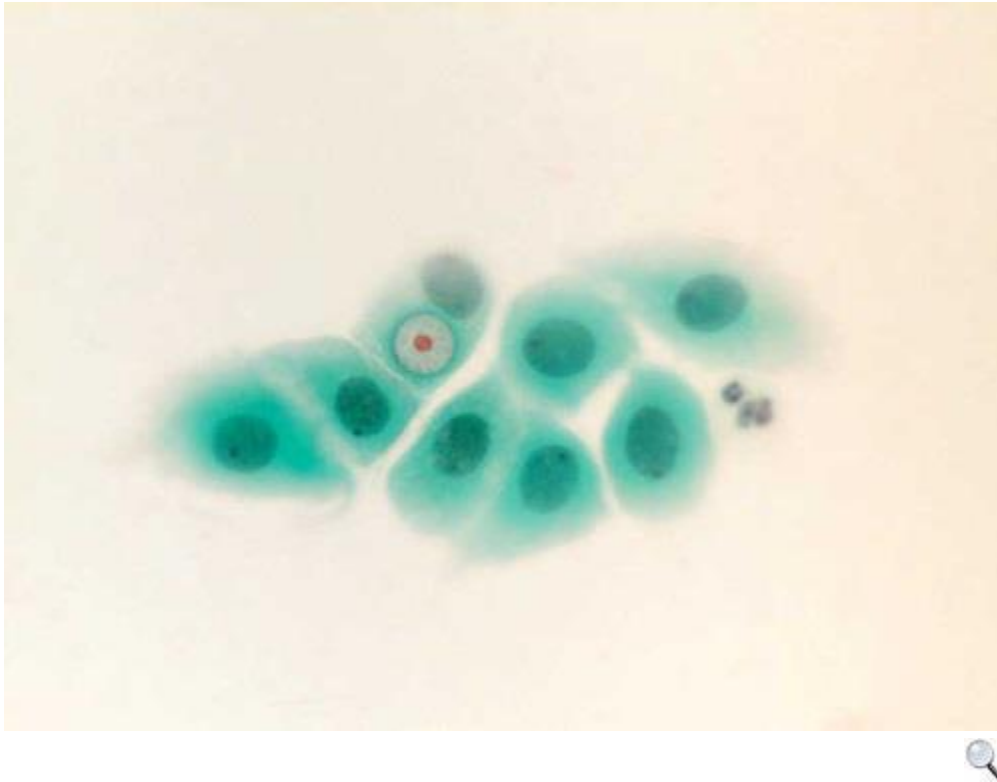
Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years

- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted

- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

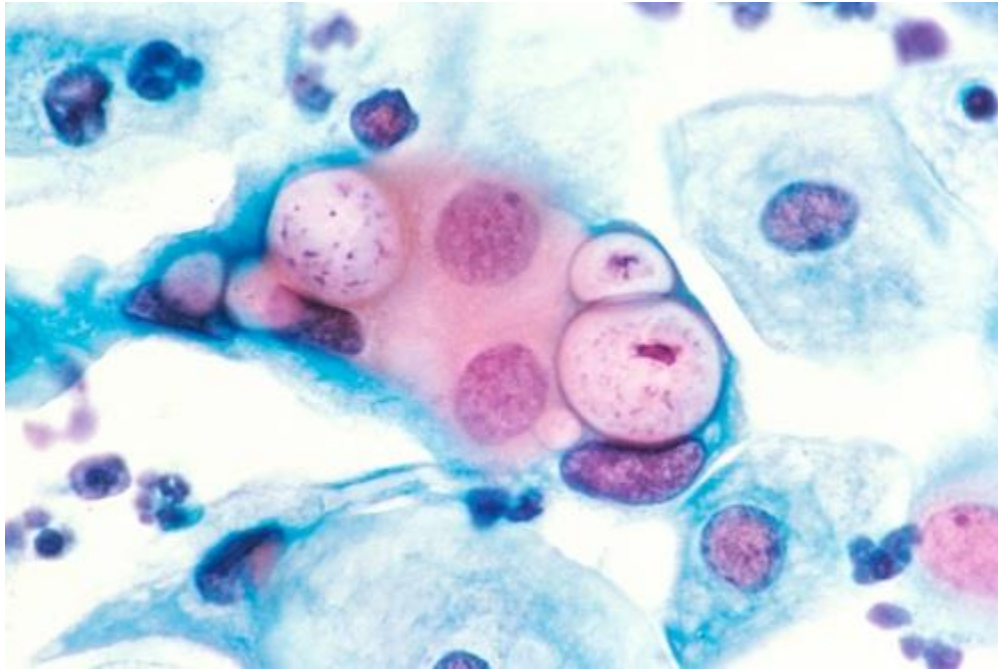


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



Question 60 of 143

Next

Which one of the following patients does the Department of Health not specifically recommend receives an annual influenza vaccination?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. 57-year-old man who had a bowel resection for colorectal cancer last year |
| <input type="radio"/> | B. 45-year-old man with motor neuron disease who lives in a nursing home |
| <input type="radio"/> | C. 6-year-old boy with diabetes mellitus |
| <input type="radio"/> | D. 24-year-old female with asthma who uses salbutamol and becotide |



E. 72-year-old man with no past medical history

[Next question](#)

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Remember the differing advice for asthmatics:

- influenza vaccine: asthmatics who use inhaled steroids
- pneumococcal vaccine: only if the patient requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)

- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



Question 61 of 143

Next

A 24-year-old man presents with a three day history of painful ulcers on the shaft of his penis and dysuria. He has had no similar previous episodes. A clinical diagnosis of primary genital herpes is made. What is the most appropriate management?



- | | |
|-----------------------|------------------------------|
| <input type="radio"/> | A. Topical famciclovir |
| <input type="radio"/> | B. No treatment is indicated |
| <input type="radio"/> | C. Topical podophyllotoxin |
| <input type="radio"/> | D. Topical valaciclovir |



E. Oral aciclovir

[Next question](#)

Oral antiviral therapy is indicated for primary genital herpes infections, even if the presentation is delayed for up to 5 days

Herpes simplex virus

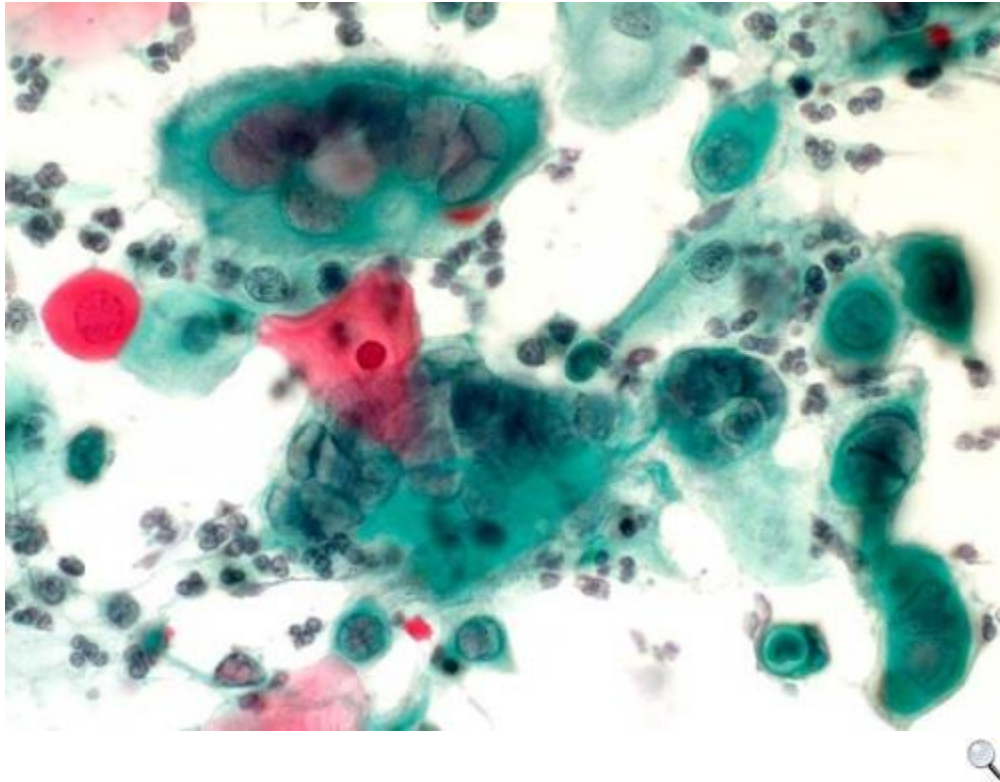
There are two strains of the herpes simplex virus (HSV) in humans: HSV-1 and HSV-2. Whilst it was previously thought HSV-1 accounted for oral lesions (cold sores) and HSV-2 for genital herpes it is now known there is considerable overlap

Features

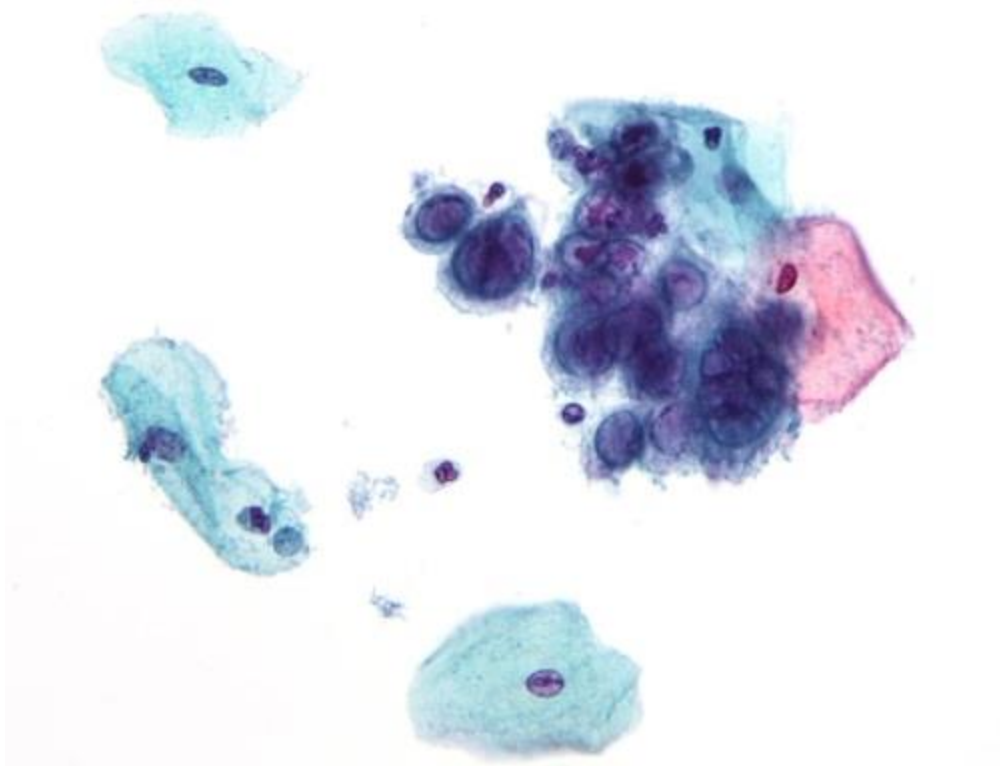
- primary infection: may present with a severe gingivostomatitis
- cold sores
- painful genital ulceration

Management

- gingivostomatitis: oral aciclovir, chlorhexidine mouthwash
- cold sores: topical aciclovir although the evidence base for this is modest
- genital herpes: oral aciclovir. Some patients with frequent exacerbations may benefit from longer term aciclovir



Pap smear. Multinucleated giant cells representing infection by the herpes simplex virus. Note the 3 M's; Multinucleation, Margination of the chromatin, Molding of the nuclei





Further Pap smear showing the cytopathic effect of HSV (multi-nucleation, ground glass & margined chromatin)



Question 62 of 143

Next

A 41-year-old female presents with 3 day history of a dry cough and shortness of breath. This was preceded by flu-like symptoms. On examination there is a symmetrical, erythematous rash with 'target' lesions over the whole body. What is the likely organism causing the symptoms?



- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. <i>Pseudomonas</i> |
| <input type="radio"/> | B. <i>Staphylococcus aureus</i> |
| <input checked="" type="radio"/> | C. <i>Mycoplasma pneumoniae</i> |
| <input type="radio"/> | D. <i>Chlamydia pneumoniae</i> |
| <input type="radio"/> | E. <i>Legionella pneumophila</i> |

Next question

Pneumococcus may also cause erythema multiforme

Mycoplasma pneumoniae

Mycoplasma pneumoniae is a cause of atypical pneumonia which often affects younger patients. It is associated with a number of characteristic complications such as erythema multiforme and cold autoimmune haemolytic anaemia. Epidemics of *Mycoplasma pneumoniae* classically occur every 4 years. It is important to recognise atypical pneumonias as they may not respond to penicillins or cephalosporins due to it lacking a peptidoglycan cell wall.

Features

- the disease typically has a prolonged and gradual onset
- flu-like symptoms classically precede a dry cough
- bilateral consolidation on x-ray
- complications may occur as below

Complications

- cold agglutins (IgM) may cause an haemolytic anaemia, thrombocytopenia
- erythema multiforme, erythema nodosum
- meningoencephalitis, Guillain-Barre syndrome
- bullous myringitis: painful vesicles on the tympanic membrane
- pericarditis/myocarditis
- gastrointestinal: hepatitis, pancreatitis
- renal: acute glomerulonephritis

Investigations

- diagnosis is generally by Mycoplasma serology
- positive cold agglutination test

Management

- erythromycin/clarithromycin
- tetracyclines such as doxycycline are an alternative



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Next

A woman who is 14 weeks pregnant presents as she came into contact with a child who has chickenpox around 4 days ago. She is unsure if she had the condition herself as a child. Blood tests show the following:

Varicella IgM	Negative
Varicella IgG	Negative

What is the most appropriate management?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Varicella zoster immunoglobulin |
| <input type="radio"/> | B. No action required |
| <input type="radio"/> | C. IV aciclovir |
| <input type="radio"/> | D. Varicella zoster vaccination |
| <input type="radio"/> | E. Varicella zoster vaccination + varicella zoster immunoglobulin |

Next question

Chickenpox exposure in pregnancy - if not immune give VZIG

The negative IgG indicates no previous exposure to chickenpox

Chickenpox exposure in pregnancy

Chickenpox is caused by primary infection with varicella zoster virus. Shingles is reactivation of dormant virus in dorsal root ganglion. In pregnancy there is a risk to both the mother and also the fetus, a syndrome now termed fetal varicella syndrome

Fetal varicella syndrome (FVS)

- risk of FVS following maternal varicella exposure is around 1% if occurs before 20 weeks gestation
- studies have shown a very small number of cases occurring between 20-28 weeks gestation and none following 28 weeks
- features of FVS include skin scarring, eye defects (microphthalmia), limb hypoplasia, microcephaly and learning disabilities

Management of chickenpox exposure

- if there is any doubt about the mother previously having chickenpox maternal blood should be checked for varicella antibodies
- if the pregnant woman is not immune to varicella she should be given varicella zoster immunoglobulin (VZIG) as soon as possible. RCOG and Greenbook guidelines suggest VZIG is effective up to 10 days post exposure

- consensus guidelines suggest oral aciclovir should be given if pregnant women with chickenpox present within 24 hours of onset of the rash



Question 64 of 143

Next

Which one of the following antibiotics is most likely to cause pseudomembranous colitis?



A. Cefaclor



B. Penicillin V



C. Erythromycin



D. Trimethoprim



E. Doxycycline

Next question

Cephalosporins, not just clindamycin, are strongly linked to *Clostridium difficile*

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea

- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



Question 65 of 143

Next

A 24-year-old woman presents following a sudden, acute onset of pain at the back of the ankle whilst jogging, during which she heard a cracking sound. Which one of the following medications may have contributed to this injury?



<input type="radio"/>	A. Metronidazole
<input type="radio"/>	B. Nitrofurantoin
<input type="radio"/>	C. Fluconazole
<input checked="" type="radio"/>	D. Ciprofloxacin
<input type="radio"/>	E. Terbinafine

Next question

Ciprofloxacin - tendinopathy

This patient has classical signs of Achilles tendon rupture. Tendon damage is a well documented

complication of quinolone therapy. It appears to be an idiosyncratic reaction, with the actual median duration of treatment being 8 days before problems occur

Quinolones

Quinolones are a group of antibiotics which work by inhibiting DNA synthesis and are bactericidal in nature. Examples include:

- ciprofloxacin
- levofloxacin

Mechanism of action

- inhibit topoisomeras II (DNA gyrase) and topoisomerase IV

Adverse effects

- lower seizure threshold in patients with epilepsy
- tendon damage (including rupture) - the risk is increased in patients also taking steroids
- cartilage damage has been demonstrated in animal models and for this reason quinolones are generally avoided (but not necessarily contraindicated) in children



Question 66 of 143

Next

According to recent NICE guidelines on the management of respiratory tract infections, which one of the following patients should not be considered for immediate antibiotic prescribing:



<input checked="" type="radio"/>	A. A 12-year-old who has acute sinusitis and a temperature of 37.6°C
<input type="radio"/>	B. A 23-year-old woman who has acute tonsillitis. Her temp is 37.8°C, tonsillar exudate is seen and there is tender lymph nodes
<input type="radio"/>	C. A 5-year-old who has acute otitis media associated with otorrhoea

<input type="radio"/>	D. A 7-month old who has bilateral otitis media and is afebrile
<input type="radio"/>	E. An 18-month old who has bilateral otitis media and a temperature of 38.1°C

[Next question](#)

Antibiotics are not recommended for uncomplicated sinusitis.

Respiratory tract infections: NICE guidelines

NICE issued guidance in 2008 on the management of respiratory tract infection, focusing on the prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

A no antibiotic prescribing or delayed antibiotic prescribing approach is generally recommended for patients with acute otitis media, acute sore throat/acute pharyngitis/acute tonsillitis, common cold, acute rhinosinusitis or acute cough/acute bronchitis.

However, an immediate antibiotic prescribing approach may be considered for:

- children younger than 2 years with bilateral acute otitis media
- children with otorrhoea who have acute otitis media
- patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present

The Centor criteria* are as follows:

- presence of tonsillar exudate
- tender anterior cervical lymphadenopathy or lymphadenitis
- history of fever
- absence of cough

If the patient is deemed at risk of developing complications, an immediate antibiotic prescribing policy is recommended

- are systemically very unwell
- have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications)

- are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely
- are older than 65 years with acute cough and two or more of the following, or older than 80 years with acute cough and one or more of the following:
 - - hospitalisation in previous year
 - - type 1 or type 2 diabetes
 - - history of congestive heart failure
 - - current use of oral glucocorticoids

The guidelines also suggest that patients should be advised how long respiratory tract infections may last:

- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1 1/2 weeks
- acute rhinosinusitis: 2 1/2 weeks
- acute cough/acute bronchitis: 3 weeks

*if 3 or more of the criteria are present there is a 40-60% chance the sore throat is caused by Group A beta-haemolytic *Streptococcus*



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Next

A 30-year-old man comes for review. He returned from a holiday in Egypt yesterday. For the past two days he has been passing frequent bloody diarrhoea associated with crampy abdominal pain. Abdominal examination demonstrates diffuse lower abdominal tenderness but there is no guarding or rigidity. His temperature is 37.5°C. What is the most likely causative organism?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Giardiasis |
| <input type="radio"/> | B. Enterotoxigenic <i>Escherichia coli</i> |
| <input type="radio"/> | C. <i>Staphylococcus aureus</i> |

- ☐ D. *Salmonella*
- ✓ ☒ E. *Shigella*

[Next question](#)

Enterotoxigenic *Escherichia coli* infections do not usually cause bloody diarrhoea. A differential diagnosis would be amoebic dysentery, enterohemorrhagic *Escherichia coli* and possibly *Campylobacter*.

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period

<i>Campylobacter</i>	<p>A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody</p> <p>Complications include Guillain-Barre syndrome</p>
<i>Bacillus cereus</i>	<p>Two types of illness are seen</p> <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	<p>Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks</p>

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



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Next

A 14-year-old boy presents with pyrexia, myalgia and lethargy. Clinical examination reveals a temperature of 38.8°C. He is haemodynamically stable and his chest is clear. Given the current pandemic a presumptive diagnosis of H1N1 influenza is made and oseltamivir is prescribed. What is the most likely side-effect he will experience?



- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. Dry mouth |
| <input type="radio"/> | B. Headache |
| <input type="radio"/> | C. Bronchospasm |
| <input checked="" type="radio"/> | D. Nausea |



E. Rash

[Next question](#)

Gastrointestinal symptoms are the most common side-effects of oseltamivir (Tamiflu).

H1N1 influenza pandemic

The 2009 H1N1 influenza (swine flu) outbreak was first observed in Mexico in early 2009. In June 2009, the WHO declared the outbreak to be a pandemic.

H1N1

The H1N1 virus is a subtype of the influenza A virus and the most common cause of flu in humans. The 2009 pandemic was caused by a new strain of the H1N1 virus.

The following groups are particularly at risk:

- patients with chronic illnesses and those on immunosuppressants
- pregnant women
- young children under 5 years old

Features

The majority of symptoms are typical of those seen in a flu-like illness:

- fever greater than 38°C
- myalgia
- lethargy
- headache
- rhinitis
- sore throat
- cough
- diarrhoea and vomiting

A minority of patients may go on to develop an acute respiratory distress syndrome which may require ventilatory support.

Treatment

There are two main treatments currently available:

Oseltamivir (Tamiflu)

- oral medication
- a neuraminidase inhibitor which prevents new viral particles from being released by infected cells
- common side-effects include nausea, vomiting, diarrhoea and headaches

Zanamivir (Relenza)

- inhaled medication*
- also a neuraminidase inhibitor
- may induce bronchospasm in asthmatics

*intravenous preparations are available for patients who are acutely unwell



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Next

A patient who has recently been on a camping holiday comes to see you as she is concerned that she may have developed Lyme disease. Since returning from holiday she has developed a rash and has felt tired and achy. What is the most appropriate investigation to test for Lyme disease?



- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Skin biopsy |
| <input checked="" type="radio"/> | B. Blood test for serology |
| <input type="radio"/> | C. Test for urinary antigen |
| <input type="radio"/> | D. Blood culture |
| <input type="radio"/> | E. Sputum culture |

Next question

Lyme disease

Lyme disease is caused by the spirochaete *Borrelia burgdorferi* and is spread by ticks

Features

- early: erythema chronicum migrans + systemic features (fever, arthralgia)
- CVS: heart block, myocarditis
- neuro: cranial nerve palsies, meningitis

Investigation

- serology: antibodies to *Borrelia burgdorferi*

Management

- doxycycline if early disease. Amoxicillin is an alternative if doxycycline is contraindicated (e.g. pregnancy)
- ceftriaxone if disseminated disease
- Jarisch-Herxheimer reaction is sometimes seen after initiating therapy: fever, rash, tachycardia after first dose of antibiotic (more commonly seen in syphilis, another spirochaetal disease)



Question 70 of 143

Next

A 25-year-old man presents with two day history of fever and arthralgia. On examination the following rash is seen:



What is the most likely diagnosis?

- | | |
|----------------------------------|--------------------|
| <input type="radio"/> | A. Legionella |
| <input type="radio"/> | B. Leptospirosis |
| <input checked="" type="radio"/> | C. Lyme disease |
| <input type="radio"/> | D. Actinomycosis |
| <input type="radio"/> | E. Rheumatic fever |

Next question

Erythema chronicum migrans is an early feature of Lyme disease

Lyme disease

Lyme disease is caused by the spirochaete *Borrelia burgdorferi* and is spread by ticks

Features

- early: erythema chronicum migrans + systemic features (fever, arthralgia)
- CVS: heart block, myocarditis
- neuro: cranial nerve palsies, meningitis

Investigation

- serology: antibodies to *Borrelia burgdorferi*

Management

- doxycycline if early disease. Amoxicillin is an alternative if doxycycline is contraindicated (e.g. pregnancy)
- ceftriaxone if disseminated disease
- Jarisch-Herxheimer reaction is sometimes seen after initiating therapy: fever, rash, tachycardia after first dose of antibiotic (more commonly seen in syphilis, another spirochaetal disease)



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Next

A 39-year-old man returns from a two week business trip to Kenya. Four weeks after his return he presents to his GP complaining of malaise, headaches and night sweats. On examination there is a symmetrical erythematous macular rash over his trunk and limbs associated with cervical and inguinal lymphadenopathy. What is the most likely diagnosis?



- | | |
|----------------------------------|------------------------|
| <input type="radio"/> | A. Typhoid fever |
| <input type="radio"/> | B. Tuberculosis |
| <input type="radio"/> | C. Dengue fever |
| <input type="radio"/> | D. Schistosomiasis |
| <input checked="" type="radio"/> | E. Acute HIV infection |



Next question

Man returns from trip abroad with maculopapular rash and flu-like illness - think HIV seroconversion

Stereotypes are alive and well in postgraduate exams. For questions involving businessmen always consider sexually transmitted infections. The HIV prevalence rate in Kenya is currently around 8%.

HIV: seroconversion

HIV seroconversion is symptomatic in 60-80% of patients and typically presents as a glandular fever type illness. Increased symptomatic severity is associated with poorer long term prognosis. It typically occurs 3-12 weeks after infection

Features

- sore throat
- lymphadenopathy
- malaise, myalgia, arthralgia
- diarrhoea
- maculopapular rash
- mouth ulcers
- rarely meningoencephalitis

Diagnosis

- antibodies to HIV may not be present
- HIV PCR and p24 antigen tests can confirm diagnosis

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[Next](#)

Theme: Malaria: prophylaxis

A.	Quinine
B.	Chloroquine
C.	Atovaquone + proguanil
D.	Doxycycline
E.	Proguanil
F.	Artemether + lumefantrine

G. Primaquine

For each one of the following statements, select the type of malaria prophylaxis from the list of options

72. Should be avoided if the patient has a history of epilepsy

 You answered Quinine

The correct answer is Chloroquine

73. Can be stopped just one week after returning from a malarial zone

 You answered Chloroquine

The correct answer is Atovaquone + proguanil

74. Is taken weekly

 You answered Primaquine

The correct answer is Chloroquine

[Next question](#)

Malaria: prophylaxis

There are around 1,500-2,000 cases each year of malaria in patients returning from endemic countries. The majority of these cases (around 75%) are caused by the potentially fatal *Plasmodium falciparum* protozoa. The majority of patients who develop malaria did not take prophylaxis. It should also be remembered that UK citizens who originate from malaria endemic areas quickly lose their innate immunity.

Up-to-date charts with recommended regimes for malarial zones should be consulted prior to prescribing

Drug	Side-effects + notes	Time to begin before travel	Time to end after travel
Atovaquone + proguanil (Malarone)	GI upset	1 - 2 days	7 days
Chloroquine	Headache Contraindicated in epilepsy Taken weekly	1 week	4 weeks
Doxycycline	Photosensitivity Oesophagitis	1 - 2 days	4 weeks
Mefloquine (Lariam)	Dizziness Neuropsychiatric disturbance Contraindicated in epilepsy Taken weekly	2 - 3 weeks	4 weeks
Proguanil (Paludrine)		1 week	4 weeks
Proguanil + chloroquine	See above	1 week	4 weeks

Pregnant women should be advised to avoid travelling to regions where malaria is endemic.

Diagnosis can also be difficult as parasites may not be detectable in the blood film due to placental sequestration. However, if travel cannot be avoided:

- chloroquine can be taken
- proguanil: folate supplementation (5mg od) should be given
- Malarone (atovaquone + proguanil): the BNF advises to avoid these drugs unless essential. If taken then folate supplementation should be given
- mefloquine: caution advised
- doxycycline is contraindicated

It is again advisable to avoid travel to malaria endemic regions with children if avoidable. However, if travel is essential then children should take malarial prophylaxis as they are more at risk of serious complications.

- diethyltoluamide (DEET) 20-50% can be used in children over 2 months of age

- doxycycline is only licensed in the UK for children over the age of 12 years



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Next

A phlebotomist in the surgery sustains a needlestick injury whilst taking blood from a patient who is known to be HIV positive. Following thorough washing of the wound what is the most appropriate management?



<input type="radio"/>	A. HIV test of phlebotomist in 3 months to determine treatment
<input type="radio"/>	B. Refer to GUM for immediate p24 HIV test of phlebotomist to determine treatment
<input checked="" type="radio"/>	C. Refer to Emergency Department + oral antiretroviral therapy for 4 weeks
<input type="radio"/>	D. Refer to Emergency Department + oral antiretroviral therapy for 3 months
<input type="radio"/>	E. Reassure low risk of transmission

Next question

Post-exposure prophylaxis for HIV: oral antiretroviral therapy for 4 weeks

Post-exposure prophylaxis

Hepatitis A

- Human Normal Immunoglobulin (HNIG) or hepatitis A vaccine may be used depending on the clinical situation

Hepatitis B

- HBsAg positive source: if the person exposed is a known responder to HBV vaccine then a booster dose should be given. If they are in the process of being vaccinated or are a non-responder they need to have hepatitis B immune globulin (HBIG) and the vaccine
- unknown source: for known responders the green book advises considering a booster dose of HBV vaccine. For known non-responders HBIG + vaccine should be given whilst those in the process of being vaccinated should have an accelerated course of HBV vaccine

Hepatitis C

- monthly PCR - if seroconversion then interferon +/- ribavirin

HIV

- a combination of oral antiretrovirals (e.g. Tenofovir, emtricitabine, lopinavir and ritonavir) as soon as possible (i.e. Within 1-2 hours, but may be started up to 72 hours following exposure) for 4 weeks
- serological testing at 12 weeks following completion of post-exposure prophylaxis
- reduces risk of transmission by 80%

Varicella zoster



- VZIG for IgG negative pregnant women/immunosuppressed

Estimates of transmission risk for single needlestick injury

Hepatitis B	20-30%
Hepatitis C	0.5-2%
HIV	0.3%



A 54-year-old woman with a history of rheumatoid arthritis presents with a one week history of bloody diarrhoea. This has been associated with fever and abdominal pain. Her rheumatoid is normally well controlled with methotrexate. A stool sample is sent which shows *Campylobacter jejuni*. What is the most appropriate management?

-  ☐ A. Fluids alone
- ☐ B. Fluids + metronidazole
- ☐ C. Fluids + ciprofloxacin
-  ☒ D. Fluids + clarithromycin
- ☐ E. Fluids + mebendazole

Next question

This lady is immunocompromised on methotrexate and a severe infection (fever, bloody diarrhoea and prolonged history). She should therefore be given an antibiotic. The BNF advise clarithromycin first-line.

Campylobacter

Campylobacter is the commonest bacterial cause of infectious intestinal disease in the UK. The majority of cases are caused by the Gram-negative bacillus *Campylobacter jejuni*. It is spread by the faecal-oral route and has an incubation period of 1-6 days.

Features

- prodrome: headache malaise
- diarrhoea: often bloody
- abdominal pain

Management

- usually self-limiting
- the BNF advises treatment if severe or the patient is immunocompromised. Clinical Knowledge summaries also recommend antibiotics if severe symptoms (high fever, bloody diarrhoea, or more than eight stools per day) or symptoms have last more than one week
- the first-line antibiotic is clarithromycin

Complications

- Guillain-Barre syndrome may follow *Campylobacter jejuni* infections
- Reiter's syndrome
- septicaemia, endocarditis, arthritis



Question 77 of 143

Next

Which one of the following patients should be vaccinated against pneumococcus?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. A 31-year-old woman who has multiple sclerosis. She lives in supported accommodation due to her disability |
| <input type="radio"/> | B. A 57-year-old women with well controlled hypertension who currently takes ramipril and bendroflumethiazide |
| <input type="radio"/> | C. A 44-year-old homeless man who has been diagnosed as having tuberculosis in the past |
| <input checked="" type="radio"/> | D. A 67-year-old man who has no significant medical history of note other than gout |
| <input type="radio"/> | E. A 43-year-old man with asthma who uses a salbutamol, beclometasone and salmeterol inhaler |

Next question

Asthmatics only require the pneumococcal vaccine if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'. Multiple sclerosis is not an indication for the pneumococcal vaccine. The 67-year-old man qualifies on account of his age, rather than his medical history.

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Pneumococcal vaccine

There are two type of pneumococcal vaccine currently in use:

- pneumococcal conjugate vaccine (PCV)
- pneumococcal polysaccharide vaccine (PPV)

The PCV is given to children as part of their routine immunisations (at 2, 4 and 13 months).

The PPV is offered to all adults over the age of 65 years, to patients with chronic conditions such as COPD and to those who have had a splenectomy (see below).

Groups who should be vaccinated:

- asplenia or splenic dysfunction
- chronic respiratory disease: COPD, bronchiectasis, cystic fibrosis, interstitial lung disease. Asthma is only included if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'
- chronic heart disease: ischaemic heart disease if requiring medication or follow-up, heart failure, congenital heart disease. Controlled hypertension is not an indication for vaccination
- chronic kidney disease
- chronic liver disease: including cirrhosis and chronic hepatitis
- diabetes mellitus if requiring medication
- immunosuppression (either due to disease or treatment). This includes patients with any stage of HIV infection
- cochlear implants
- patients with cerebrospinal fluid leaks

Adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years.



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Next

A pregnant woman in her second trimester asks for advice about malaria prophylaxis. Which one of the following statements is true?



- | | |
|-----------------------|---|
| <input type="radio"/> | A. Doxycycline can be used in the third trimester |
| <input type="radio"/> | B. Chloroquine should be avoided in the first and second trimesters |

- ☐ C. Mefloquine is the anti-malarial of choice in pregnancy
- ☐ D. Malarone (atovaquone + proguanil) is safe in all trimesters of pregnancy
- ☒ E. Folic acid should be prescribed for pregnant patients taking proguanil

Next question

Malaria: prophylaxis

There are around 1,500-2,000 cases each year of malaria in patients returning from endemic countries. The majority of these cases (around 75%) are caused by the potentially fatal *Plasmodium falciparum* protozoa. The majority of patients who develop malaria did not take prophylaxis. It should also be remembered that UK citizens who originate from malaria endemic areas quickly lose their innate immunity.

Up-to-date charts with recommended regimes for malarial zones should be consulted prior to prescribing

Drug	Side-effects + notes	Time to begin before travel	Time to end after travel
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Chloroquine	Headache Contraindicated in epilepsy Taken weekly	1 week	4 weeks
Doxycycline	Photosensitivity Oesophagitis	1 - 2 days	4 weeks
Mefloquine (Lariam)	Dizziness Neuropsychiatric disturbance Contraindicated in epilepsy Taken weekly	2 - 3 weeks	4 weeks

Proguanil (Paludrine)		1 week	4 weeks
Proguanil + chloroquine	See above	1 week	4 weeks

Pregnant women should be advised to avoid travelling to regions where malaria is endemic.

Diagnosis can also be difficult as parasites may not be detectable in the blood film due to placental sequestration. However, if travel cannot be avoided:

- chloroquine can be taken
- proguanil: folate supplementation (5mg od) should be given
- Malarone (atovaquone + proguanil): the BNF advises to avoid these drugs unless essential. If taken then folate supplementation should be given
- mefloquine: caution advised
- doxycycline is contraindicated

It is again advisable to avoid travel to malaria endemic regions with children if avoidable. However, if travel is essential then children should take malarial prophylaxis as they are more at risk of serious complications.

- diethyltoluamide (DEET) 20-50% can be used in children over 2 months of age
- doxycycline is only licensed in the UK for children over the age of 12 years



Question 79 of 143

Next

A 33-year-old man presents with a one day history of pain and swelling in the right testicle. Around four weeks ago he returned from a holiday in Spain but reports no dysuria or urethral discharge. On examination he has a tender, swollen right testicle. On examination the heart rate is 84/min and his temperature is 37.1°C. What is the most appropriate management?



- ☒ A. IM ceftriaxone stat + oral doxycycline for 2 weeks
- ☐ B. Oral doxycycline + metronidazole for 2 weeks
- ☐ C. Oral trimethopim for 2 weeks

<input type="radio"/>	D. Oral azithromycin stat dose
<input type="radio"/>	E. Oral ciprofloxacin for 2 weeks

Next question

Epididymo-orchitis

Epididymo-orchitis describes an infection of the epididymis +/- testes resulting in pain and swelling. It is most commonly caused by local spread of infections from the genital tract (such as *Chlamydia trachomatis* and *Neisseria gonorrhoeae*) or the bladder.

The most important differential diagnosis is testicular torsion. This needs to be excluded urgently to prevent ischaemia of the testicle.

Features

- unilateral testicular pain and swelling
- urethral discharge may be present, but urethritis is often asymptomatic
- factors suggesting testicular torsion include patients < 20 years, severe pain and an acute onset

Management

- the British Association for Sexual Health and HIV (BASHH) produced guidelines in 2010
- if the organism is unknown BASHH recommend: ceftriaxone 500mg intramuscularly single dose, plus doxycycline 100mg by mouth twice daily for 10-14 days
- further investigations following treatment are recommended to exclude any underlying structural abnormalities



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Next

Which one of the following drugs used in the management of tuberculosis is most associated with peripheral neuropathy?

	<input type="radio"/>	A. Rifampicin
	<input type="radio"/>	B. Pyrazinamide
	<input type="radio"/>	C. Ethambutol
	<input type="radio"/>	D. Streptomycin
	<input checked="" type="radio"/>	E. Isoniazid

Next question

Isoniazid causes peripheral neuropathy

Tuberculosis: drug side-effects and mechanism of action

Rifampicin

- mechanism of action: inhibits bacterial DNA dependent RNA polymerase preventing transcription of DNA into mRNA
- potent liver enzyme inducer
- hepatitis, orange secretions
- flu-like symptoms

Isoniazid

- mechanism of action: inhibits mycolic acid synthesis
- peripheral neuropathy: prevent with pyridoxine (Vitamin B6)
- hepatitis, agranulocytosis
- liver enzyme inhibitor

Pyrazinamide

- mechanism of action: converted by pyrazinamidase into pyrazinoic acid which in turn inhibits fatty acid synthase (FAS) I
- hyperuricaemia causing gout

- arthralgia, myalgia
- hepatitis

Ethambutol

- mechanism of action: inhibits the enzyme arabinosyl transferase which polymerizes arabinose into arabinan
- optic neuritis: check visual acuity before and during treatment
- dose needs adjusting in patients with renal impairment



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Next

A 48-year-old salesman presents with a 5 day history of cough and pleuritic chest pain. He has no past medical history of note. On examination his temperature is 38.2°C, blood pressure is 120/80 mmHg, respiratory rate 18/min and pulse 84/min. Auscultation of the chest reveals bronchial breathing in the left base and the same area is dull to percussion. What is the most suitable management?



- | | |
|----------------------------------|------------------------------------|
| <input checked="" type="radio"/> | A. Oral amoxicillin |
| <input type="radio"/> | B. Oral co-amoxiclav |
| <input type="radio"/> | C. Oral amoxicillin + erythromycin |
| <input type="radio"/> | D. Oral erythromycin |
| <input type="radio"/> | E. Admit |



Next question

Pneumonia: community-acquired

Community acquired pneumonia (CAP) may be caused by the following infectious agents:

- *Streptococcus pneumoniae* (accounts for around 80% of cases)

- *Haemophilus influenzae*
- *Staphylococcus aureus*: commonly after the 'flu
- atypical pneumonias (e.g. Due to *Mycoplasma pneumoniae*)
- viruses

Klebsiella pneumoniae is classically in alcoholics

***Streptococcus pneumoniae* (pneumococcus)** is the most common cause of community-acquired pneumonia

Characteristic features of pneumococcal pneumonia

- rapid onset
- high fever
- pleuritic chest pain
- herpes labialis

Management

CURB-65 criteria of severe pneumonia

- Confusion (abbreviated mental test score $\leq 8/10$)
- Urea > 7 mmol/L
- Respiratory rate ≥ 30 / min
- BP: systolic ≤ 90 or diastolic ≤ 60 mmHg
- age ≥ 65 years

Patients with 3 or more (out of 5) of the above criteria are regarded as having a severe pneumonia

The British Thoracic Society published guidelines in 2009:

- low or moderate severity CAP: oral amoxicillin. A macrolide should be added for patients admitted to hospital
- high severity CAP: intravenous co-amoxiclav + clarithromycin OR cefuroxime + clarithromycin OR cefotaxime + clarithromycin
- the current BNF has slightly different recommendations for high severity CAP: intravenous benzylpenicillin + clarithromycin OR benzylpenicillin + doxycycline. For 'life-threatening' infections the BNF recommends the same as the BTS guidelines for high-severity CAP



Question 82 of 143

Next

A 54-year-old female is presents to surgery one week following a cholecystectomy with profuse diarrhoea. What is the most likely diagnosis?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. <i>Campylobacter</i> |
| <input type="radio"/> | B. <i>E. coli</i> |
| <input checked="" type="radio"/> | C. <i>Clostridium difficile</i> |
| <input type="radio"/> | D. <i>Salmonella</i> |
| <input type="radio"/> | E. <i>Staphylococcus aureus</i> |

Next question

Clostridium difficile is the most likely cause as the patient would have been given broad-spectrum antibiotics at the time of the operation

Clostridium difficile

Clostridium difficile is a Gram positive rod often encountered in hospital practice. It produces an exotoxin which causes intestinal damage leading to a syndrome called pseudomembranous colitis. *Clostridium difficile* develops when the normal gut flora are suppressed by broad-spectrum antibiotics. Clindamycin is historically associated with causing *Clostridium difficile* but the aetiology has evolved significantly over the past 10 years. Second and third generation cephalosporins are now the leading cause of *Clostridium difficile*.

Features

- diarrhoea
- abdominal pain
- a **raised white blood cell count** is characteristic
- if severe toxic megacolon may develop

Diagnosis is made by detecting *Clostridium difficile* toxin (CDT) in the stool

Management

- first-line therapy is oral metronidazole for 10-14 days
- if severe or not responding to metronidazole then oral vancomycin may be used
- for life-threatening infections a combination of oral vancomycin and intravenous metronidazole should be used



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Next

Which one of the following causes of gastroenteritis has the longest incubation period?



<input type="radio"/>	A. <i>Campylobacter</i>
<input type="radio"/>	B. <i>Bacillus cereus</i>
<input type="radio"/>	C. <i>Shigella</i>
<input checked="" type="radio"/>	D. Giardiasis
<input type="radio"/>	E. <i>Salmonella</i>

Next question

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none">• vomiting within 6 hours, stereotypically due to rice• diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



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Next

Which one of the following best describes the standard immunisation schedule against hepatitis B?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. 2 doses of the vaccine + a booster at 5 years |
| <input type="radio"/> | B. 3 doses of the vaccine |
| <input type="radio"/> | C. 3 doses of the vaccine + a booster at 10 years |
| <input checked="" type="radio"/> | D. 3 doses of the vaccine + a booster at 5 years |
| <input type="radio"/> | E. 2 doses of the vaccine + a booster at 10 years |



Next question

Hepatitis B

Hepatitis B is a double-stranded DNA hepadnavirus and is spread through exposure to infected blood or body fluids, including vertical transmission from mother to child. The incubation period is 6-20 weeks.

The features of hepatitis B include fever, jaundice and elevated liver transaminases.

Complications of hepatitis B infection

- chronic hepatitis (5-10%)
- fulminant liver failure (1%)
- hepatocellular carcinoma
- glomerulonephritis
- polyarteritis nodosa
- cryoglobulinaemia

Immunisation against hepatitis B (please see the Greenbook link for more details)

- contains HBsAg adsorbed onto aluminium hydroxide adjuvant and is prepared from yeast cells using recombinant DNA technology
- most schedules give 3 doses of the vaccine with a recommendation for a one-off booster 5 years following the initial primary vaccination
- at risk groups who should be vaccinated include: healthcare workers, intravenous drug users, sex workers, close family contacts of an individual with hepatitis B, individuals receiving blood transfusions regularly, chronic kidney disease patients who may soon require renal replacement therapy, prisoners, chronic liver disease patients
- around 10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine. Risk factors include age over 40 years, obesity, smoking, alcohol excess and immunosuppression
- testing for anti-HBs is only recommended for those at risk of occupational exposure (i.e. Healthcare workers) and patients with chronic kidney disease. In these patients anti-HBs levels should be checked 1-4 months after primary immunisation
- the table below shows how to interpret anti-HBs levels:

Anti-HBs level (mIU/ml)	Response
> 100	Indicates adequate response, no further testing required. Should still receive booster at 5 years
10 - 100	Suboptimal response - one additional vaccine dose should be given. If immunocompetent no further testing is required
< 10	Non-responder. Test for current or past infection. Give further vaccine course (i.e. 3 doses again) with testing following. If still fails to respond then HBIG would be required for protection if exposed to the virus

Management of hepatitis B

- pegylated interferon-alpha used to be the only treatment available. It reduces viral replication in up to 30% of chronic carriers. A better response is predicted by being female, < 50 years old, low HBV DNA levels, non-Asian, HIV negative, high degree of inflammation on liver biopsy

- whilst NICE still advocate the use of pegylated interferon first-line other antiviral medications are increasingly used with an aim to suppress viral replication (not in a dissimilar way to treating HIV patients)
- examples include tenofovir and entecavir



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Next

Which one of the following statements regarding the seasonal injectable influenza vaccine is true?



<input checked="" type="radio"/>	A. Should be stored between +2 and +8°C
<input type="radio"/>	B. Protects against influenza subtypes A, B and C
<input type="radio"/>	C. Can cause the flu if the patient is severely immunosuppressed
<input type="radio"/>	D. All asthmatic patients should be offered the vaccine
<input type="radio"/>	E. A 9-year-old child requires half the normal adult dose

Next question

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



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Next

A 50-year-old sewage worker presents with a one week history of fever and feeling generally unwell. Which one of the following features would be least consistent with a diagnosis of leptospirosis?

	<input type="radio"/>	A. Meningism
	<input type="radio"/>	B. Conjunctival erythema
	<input checked="" type="radio"/>	C. Productive cough
	<input type="radio"/>	D. Decreased urine output
	<input type="radio"/>	E. Severe myalgia

Next question

Pulmonary complications can occur in leptospirosis but generally happen in severe and late-stage disease. Severe disease may result in acute respiratory distress syndrome or pulmonary haemorrhage.

Leptospirosis

Also known as Weil's disease*, leptospirosis is commonly seen in questions referring to sewage workers, farmers, vets or people who work in abattoir. It is caused by the spirochaete *Leptospira interrogans* (serogroup L icterohaemorrhagiae), classically being spread by contact with infected rat urine. Weil's disease should always be considered in high-risk patients with hepatorenal failure

Features

- fever
- flu-like symptoms
- renal failure (seen in 50% of patients)
- jaundice
- subconjunctival haemorrhage
- headache, may herald the onset of meningitis

Management

- high-dose benzylpenicillin or doxycycline

*the term Weil's disease is sometimes reserved for the most severe 10% of cases that are associated with jaundice

**Question 87 of 143**

Next

A 35-year-old man who is known to have advanced HIV disease presents with dysphagia and odynophagia. What is the most likely cause of his problems?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Cytomegalovirus oesophagitis |
| <input type="radio"/> | B. Herpes simplex oesophagitis |
| <input checked="" type="radio"/> | C. Oesophageal candidiasis |
| <input type="radio"/> | D. Oesophageal Kaposi's sarcoma |
| <input type="radio"/> | E. Oesophageal lymphoma |

Next question

HIV: oesophageal candidiasis

Oesophageal candidiasis is the most common cause of oesophagitis in patients with HIV. It is generally seen in patients with a CD4 count of less than 100. Typical symptoms include dysphagia and odynophagia. Fluconazole and itraconazole are first-line treatments

2 / 3

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Next

Theme: BNF antibiotic guidelines

- | |
|---|
| A. Intramuscular ceftriaxone + oral azithromycin |
| B. Trimethoprim or nitrofurantoin or amoxicillin or cephalosporin |
| C. Quinolone or trimethoprim |
| D. Doxycycline + metronidazole + ceftriaxone |

E.	Doxycycline + amoxicillin + ciprofloxacin
F.	Phenoxymethylpenicillin + flucloxacillin
G.	Flucloxacillin
H.	Amoxicillin or doxycycline or erythromycin
I.	Doxycycline
J.	Broad-spectrum cephalosporin or trimethoprim

For each one of the following conditions please select the antibiotic choice that best reflects current BNF guidelines:

88. Gonorrhoea

✓ Intramuscular ceftriaxone + oral azithromycin

89. Extensive otitis externa

✓ Flucloxacillin

90. Pelvic inflammatory disease

✗ You answered Broad-spectrum cephalosporin or trimethoprim

The correct answer is Doxycycline + metronidazole + ceftriaxone

[Next question](#)

Antibiotic guidelines

The following is based on current BNF guidelines:

Respiratory system

Condition	Recommended treatment
-----------	-----------------------

Exacerbations of chronic bronchitis	Amoxicillin or tetracycline or clarithromycin
Uncomplicated community-acquired pneumonia	Amoxicillin (Doxycycline or clarithromycin in penicillin allergic, add flucloxacillin if staphylococci suspected e.g. In influenza)
Pneumonia possibly caused by atypical pathogens	Clarithromycin
Hospital-acquired pneumonia	Within 5 days of admission: co-amoxiclav or cefuroxime More than 5 days after admission: piperacillin with tazobactam OR a broad-spectrum cephalosporin (e.g. ceftazidime) OR a quinolone (e.g. ciprofloxacin)

Urinary tract

Condition	Recommended treatment
Lower urinary tract infection	Trimethoprim or nitrofurantoin. Alternative: amoxicillin or cephalosporin
Acute pyelonephritis	Broad-spectrum cephalosporin or quinolone
Acute prostatitis	Quinolone or trimethoprim

Skin

Condition	Recommended treatment
Impetigo	Topical fusidic acid, oral flucloxacillin or erythromycin if widespread
Cellulitis	Flucloxacillin (clarithromycin or clindomycin if penicillin-allergic)
Erysipelas	Phenoxymethylpenicillin (erythromycin if penicillin-allergic)
Animal or human bite	Co-amoxiclav (doxycycline + metronidazole if penicillin-allergic)

Ear, nose & throat

Condition	Recommended treatment
-----------	-----------------------

Throat infections	Phenoxymethylpenicillin (erythromycin alone if penicillin-allergic)
Sinusitis	Amoxicillin or doxycycline or erythromycin
Otitis media	Amoxicillin (erythromycin if penicillin-allergic)
Otitis externa*	Flucloxacillin (erythromycin if penicillin-allergic)

Genital system

Condition	Recommended treatment
Gonorrhoea	Intramuscular ceftriaxone + oral azithromycin
<i>Chlamydia</i>	Doxycycline or azithromycin
Pelvic inflammatory disease	Oral ofloxacin + oral metronidazole or intramuscular ceftriaxone + oral doxycycline + oral metronidazole
Syphilis	Benzathine benzylpenicillin or doxycycline or erythromycin
Bacterial vaginosis	Oral or topical metronidazole or topical clindamycin

*a combined topical antibiotic and corticosteroid is generally used for mild/moderate cases of otitis externa



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Next

Which one of the following is true regarding anti-tuberculous therapy?



- ☒ A. Rifampicin is a potent liver enzyme inhibitor
- ☐ B. Pyrazinamide should be added to therapy after 8 weeks
- ☐ C. Major side-effects of pyrazinamide include peripheral neuropathy



D. Visual acuity should be checked before starting ethambutol



E. Ethambutol should only be added if drug-resistant tuberculosis is suspected

Next question

Rifampicin is a potent liver enzyme inducer. Pyrazinamide should be given for the first two months of therapy - side-effects include hepatitis and gout. Peripheral neuropathy is a side-effect of isoniazid

Tuberculosis: drug therapy

The standard therapy for treating **active tuberculosis** is:

Initial phase - first 2 months (RIPE)

- Rifampicin
- Isoniazid
- Pyrazinamide
- Ethambutol (the 2006 NICE guidelines now recommend giving a 'fourth drug' such as ethambutol routinely - previously this was only added if drug-resistant tuberculosis was suspected)

Continuation phase - next 4 months

- Rifampicin
- Isoniazid

The treatment for **latent tuberculosis** is isoniazid alone for 6 months

Patients with **meningeal tuberculosis** are treated for a prolonged period (at least 12 months) with the addition of steroids

Directly observed therapy with a three times a week dosing regimen may be indicated in certain groups, including:

- homeless people with active tuberculosis
- patients who are likely to have poor concordance
- all prisoners with active or latent tuberculosis



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Next

You are speaking to the partner of a man who has recently been admitted to hospital with pyrexia and neck stiffness. The hospital have just phoned the surgery as the CSF microscopy showed a Gram-negative diplococcus, suggestive of meningococcal septicaemia. No other results concerning the serotype of the organism are yet available.

The partner is 27-years-old and has no past medical history of note other than depression for which she takes fluoxetine. She has had a full course of immunisations including a course of MenC vaccines whilst at university 8 years ago. What is the most appropriate initial next step to reduce her chance of developing meningitis?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. No further action is required |
| <input type="radio"/> | B. MenC booster dose |
| <input type="radio"/> | C. Oral ciprofloxacin + MenC booster dose |
| <input checked="" type="radio"/> | D. Oral ciprofloxacin |
| <input type="radio"/> | E. Oral rifampicin |

Next question

Tough question. Firstly there is the choice between ciprofloxacin and rifampicin. Rifampicin has been historically used for this purpose but the most recent guidance from the Health Protection Agency and the Greenbook supports the use of ciprofloxacin.

Secondly there is the question as to whether a booster dose of vaccine is needed. The guidelines regarding this are worded vaguely but imply that most close contacts should receive a booster dose/complete course of vaccine depending on the serotype of the organism. As this is not known, only oral chemoprophylaxis should be given for now, with the vaccine given once this is ascertained. Please see the HPA link for more details.

Meningitis: management

Investigations suggested by NICE

- full blood count

- CRP
- coagulation screen
- blood culture
- whole-blood PCR
- blood glucose
- blood gas

Lumbar puncture if no signs of raised intracranial pressure

Management

All patients should be transferred to hospital urgently. If patients are in a pre-hospital setting (for example a GP surgery) and meningococcal disease is suspected then intramuscular benzylpenicillin may be given, as long as this doesn't delay transit to hospital.

BNF recommendations on antibiotics

Scenario	BNF recommendation
Initial empirical therapy aged < 3 months	Intravenous cefotaxime + amoxicillin
Initial empirical therapy aged 3 months - 50 years	Intravenous cefotaxime
Initial empirical therapy aged > 50 years	Intravenous cefotaxime + amoxicillin
Meningococcal meningitis	Intravenous benzylpenicillin or cefotaxime
Pneumococcal meningitis	Intravenous cefotaxime
Meningitis caused by <i>Haemophilus influenzae</i>	Intravenous cefotaxime
Meningitis caused by <i>Listeria</i>	Intravenous amoxicillin + gentamicin

If the patient has a history of immediate hypersensitivity reaction to penicillin or to cephalosporins the BNF recommends using chloramphenicol.

Management of contacts

- prophylaxis needs to be offered to household and close contacts of patients affected with meningococcal meningitis

- oral ciprofloxacin or rifampicin or may be used. The Health Protection Agency (HPA) guidelines now state that whilst either may be used ciprofloxacin is the drug of choice as it is widely available and only requires one dose
- the risk is highest in the first 7 days but persists for at least 4 weeks
- meningococcal vaccination should be offered to close contacts when serotype results are available, including booster doses to those who had the vaccine in infancy
- for pneumococcal meningitis no prophylaxis is generally needed. There are however exceptions to this. If a cluster of cases of pneumococcal meningitis occur the HPA have a protocol for offering close contacts antibiotic prophylaxis. Please see the link for more details



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Next

What percentage of patients with genital *Chlamydia* infection are asymptomatic?

- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Around 90% of women and 80% of men |
| <input checked="" type="radio"/> | B. Around 90% of women and 25% of men |
| <input type="radio"/> | C. Around 50% of women and 25% of men |
| <input checked="" type="radio"/> | D. Around 70% of women and 50% of men |
| <input type="radio"/> | E. Around 50% of women and 70% of men |

Next question

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

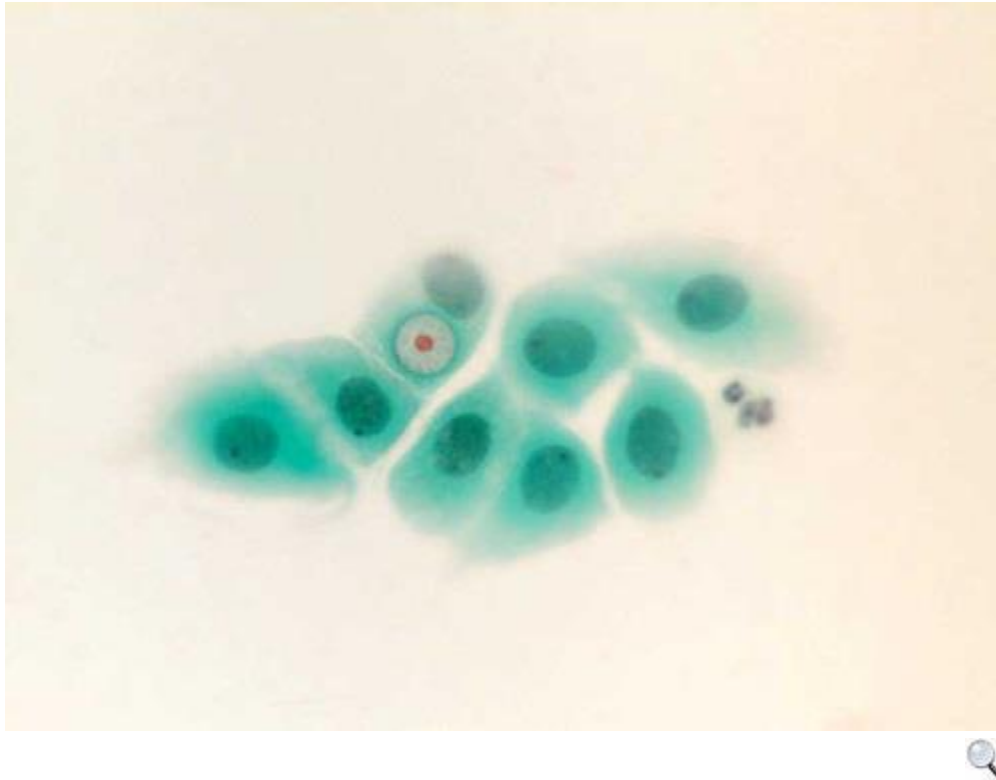
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

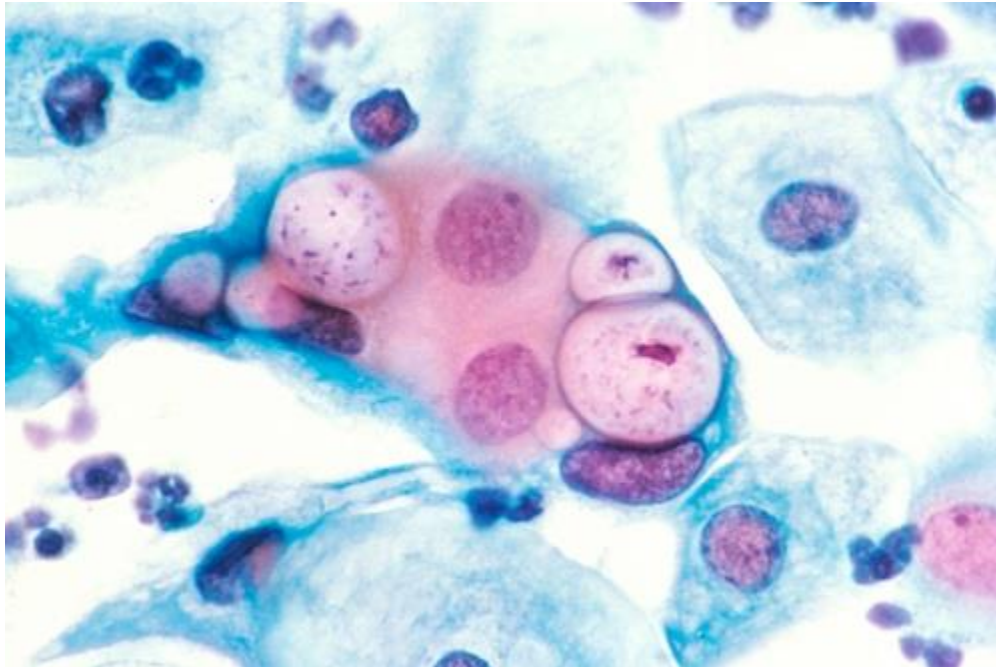


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



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Next

A 30-year-old man comes for review. He lives with a woman who has recently being diagnosed with having tuberculosis. The man was born in the UK, has no past medical history of note and is currently asymptomatic. What is the most appropriate test to check for latent tuberculosis?



A. Heaf test



B. Mantoux test



C. Sputum culture



D. Chest x-ray



E. Interferon-gamma blood test

The two main tests used for screening in the UK are the Mantoux (skin) test and the interferon-gamma (blood) test. Whilst the use of the interferon-gamma test is increasing it is still reserved for specific situations, none of which apply in this case. Please see the NICE guidelines for more details.

The Heaf test is no longer used in the UK.

Tuberculosis: screening

The Mantoux test is the main technique used to screen for latent tuberculosis. In recent years the interferon-gamma blood test has also been introduced. It is used in a number of specific situations such as:

- the Mantoux test is positive or equivocal
- people where a tuberculin test may be falsely negative (see below)

Mantoux test

- 0.1 ml of 1:1,000 purified protein derivative (PPD) injected intradermally
- result read 2-3 days later

Diameter of induration	Positivity	Interpretation
< 6mm	Negative - no significant hypersensitivity to tuberculin protein	Previously unvaccinated individuals may be given the BCG
6 - 15mm	Positive - hypersensitive to tuberculin protein	Should not be given BCG. May be due to previous TB infection or BCG
> 15mm	Strongly positive - strongly hypersensitive to tuberculin protein	Suggests tuberculosis infection.

False negative tests may be caused by:

- miliary TB
- sarcoidosis

- HIV
- lymphoma
- very young age (e.g. < 6 months)

Heaf test

The Heaf test was previously used in the UK but has been since been discontinued. It involved injection of PPD equivalent to 100,000 units per ml to the skin over the flexor surface of the left forearm. It was then read 3-10 days later.



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Next

A baby is born to a mother who is known to have chronic hepatitis B. The mothers latest results are as follows:

HBsAg	Positive
HBeAg	Positive

What is the most appropriate strategy for reducing the vertical transmission rate?



- ☒ **A.** Give the newborn hepatitis B vaccine + hepatitis B immunoglobulin
- ☐ **B.** Give the newborn hepatitis B vaccine
- ☐ **C.** Give the newborn hepatitis B immunoglobulin
- ☐ **D.** Give the mother intravenous zidovudine during labour
- ☐ **E.** Give the mother hepatitis B immunoglobulin shortly before birth + the newborn hepatitis B vaccine

Next question

HBeAg is a marker of infectivity. The Green Book guidelines advise giving both the vaccine and immunoglobulin in this situation. If the patient had antibodies against HBe (anti-HBe), rather than the

HBe antigen as in this scenario, then only the vaccine would need to be given. Please see the link for more details.

Hepatitis B and pregnancy

Basics

- all pregnant women are offered screening for hepatitis B
- babies born to mothers who are chronically infected with hepatitis B or to mothers who've had acute hepatitis B during pregnancy should receive a complete course of vaccination + hepatitis B immunoglobulin
- studies are currently evaluating the role of oral antiviral treatment (e.g. Lamivudine) in the latter part of pregnancy
- there is little evidence to suggest caesarean section reduces vertical transmission rates
- hepatitis B cannot be transmitted via breastfeeding (in contrast to HIV)



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Next

A 27-year-old pregnant woman is found to have *Chlamydia*. What is the most appropriate treatment?



- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. No antibiotic therapy is indicated |
| <input type="radio"/> | B. Cefixime |
| <input checked="" type="radio"/> | C. Erythromycin |
| <input type="radio"/> | D. Doxycycline |
| <input type="radio"/> | E. Ciprofloxacin |

Next question

Erythromycin or amoxicillin is currently recommended for pregnant or breast feeding women. The efficacy of amoxicillin, often assumed to be ineffective against *Chlamydia*, was supported in a recent Cochrane review. A test of cure should be carried out following treatment.

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

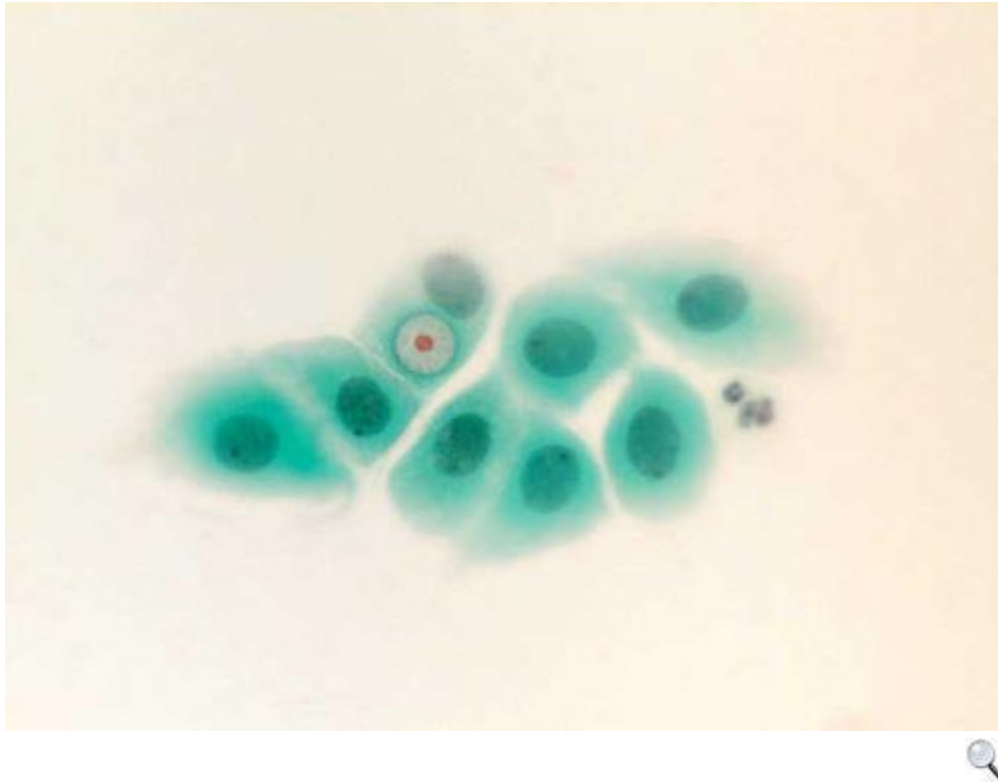
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

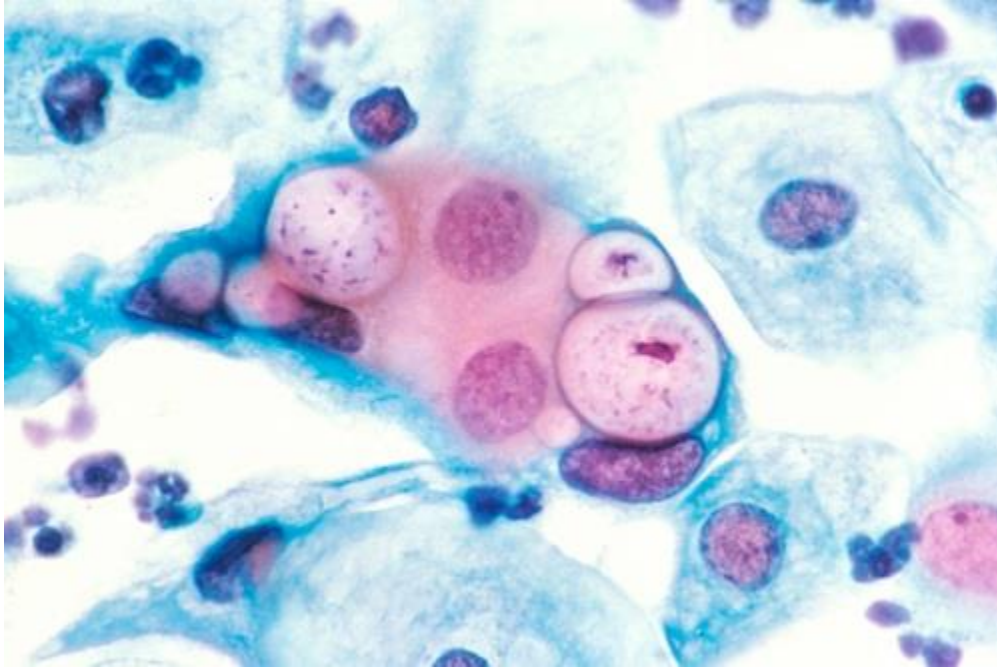


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



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Next

A 75-year-old man is awaiting admission for elective knee surgery. He has no significant past medical history of note and has not been in hospital within the past 10 years. What is the most appropriate action with regards to MRSA screening?



- | | |
|----------------------------------|---------------------------------------|
| <input checked="" type="radio"/> | A. Swab his nose |
| <input type="radio"/> | B. He does not require MRSA screening |
| <input type="radio"/> | C. Swab behind his ears |
| <input type="radio"/> | D. Swab his groin |
| <input type="radio"/> | E. Swab his axilla |

Whilst the groin and axilla are common sites for MRSA colonization the nose is nearly always colonized as well. Guidelines therefore recommend swabbing the nose.

MRSA

Methicillin-resistant *Staphylococcus aureus* (MRSA) was one of the first organisms which highlighted the dangers of hospital-acquired infections.

Who should be screened for MRSA?

- all patients awaiting elective admissions (exceptions include day patients having terminations of pregnancy and ophthalmic surgery. Patients admitted to mental health trusts are also excluded)
- from 2011 all emergency admissions will be screened

How should a patient be screened for MRSA?

- nasal swab and skin lesions or wounds
- the swab should be wiped around the inside rim of a patient's nose for 5 seconds
- the microbiology form must be labelled 'MRSA screen'

Suppression of MRSA from a carrier once identified

- nose: mupirocin 2% in white soft paraffin, tds for 5 days
- skin: chlorhexidine gluconate, od for 5 days. Apply all over but particularly to the axilla, groin and perineum

The following antibiotics are commonly used in the treatment of MRSA infections:

- vancomycin
- teicoplanin
- linezolid

Some strains may be sensitive to the antibiotics listed below but they should not generally be used alone because resistance may develop:

- rifampicin
- macrolides
- tetracyclines
- aminoglycosides
- clindamycin

Relatively new antibiotics such as linezolid, quinupristin/dalfopristin combinations and tigecycline have activity against MRSA but should be reserved for resistant cases



Question 98 of 143

Next

A 29-year-old woman presents to the genitourinary medicine clinic for treatment of recurrent genital warts. Which one the following viruses are most likely to be responsible?



- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Human papilloma virus 16 & 18 |
| <input type="radio"/> | B. Human papilloma virus 13 & 17 |
| <input checked="" type="radio"/> | C. Human papilloma virus 6 & 11 |
| <input type="radio"/> | D. Human papilloma virus 12 & 14 |
| <input type="radio"/> | E. Human papilloma virus 15 & 21 |

Next question

Genital warts - 90% are caused by HPV 6 & 11

Types 6 and 11 are responsible for 90% of genital warts cases

Genital warts

Genital warts (also known as condylomata accuminata) are a common cause of attendance at genitourinary clinics. They are caused by the many varieties of the human papilloma virus HPV, especially types 6 & 11. It is now well established that HPV (primarily types 16, 18 & 33) predisposes

to cervical cancer.

Features

- small (2 - 5 mm) fleshy protuberances which are slightly pigmented
- may bleed or itch

Management

- topical podophyllum or cryotherapy are commonly used as first-line treatments depending on the location and type of lesion. Multiple, non-keratinised warts are generally best treated with topical agents whereas solitary, keratinised warts respond better to cryotherapy
- imiquimod is a topical cream which is generally used second line
- genital warts are often resistant to treatment and recurrence is common although the majority of anogenital infections with HPV clear without intervention within 1-2 years



Question 99 of 143

Next

A 24-year-old female presents complaining of a painful lower lip. She has recently been on holiday to Mexico



What is the most likely causative organism?

- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Coxsackie A virus |
| <input type="radio"/> | B. <i>Leishmania donovani</i> |
| <input checked="" type="radio"/> | C. Herpes simplex virus type 1 |
| <input type="radio"/> | D. <i>Staphylococcus aureus</i> |
| <input type="radio"/> | E. Herpes simplex virus type 2 |

[Next question](#)

Sunlight is a common trigger for cold sores

Herpes simplex virus

There are two strains of the herpes simplex virus (HSV) in humans: HSV-1 and HSV-2. Whilst it was previously thought HSV-1 accounted for oral lesions (cold sores) and HSV-2 for genital herpes it is now known there is considerable overlap

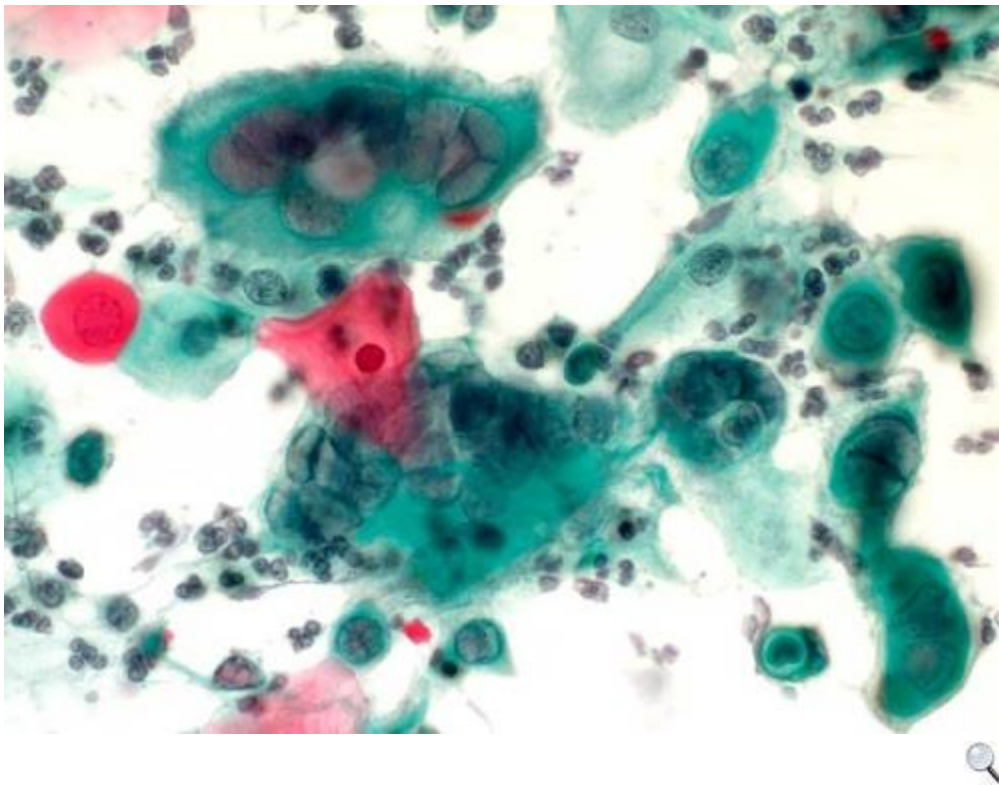
Features

- primary infection: may present with a severe gingivostomatitis
- cold sores

- painful genital ulceration

Management

- gingivostomatitis: oral aciclovir, chlorhexidine mouthwash
- cold sores: topical aciclovir although the evidence base for this is modest
- genital herpes: oral aciclovir. Some patients with frequent exacerbations may benefit from longer term aciclovir



Pap smear. Multinucleated giant cells representing infection by the herpes simplex virus. Note the 3 M's; Multinucleation, Margination of the chromatin, Molding of the nuclei

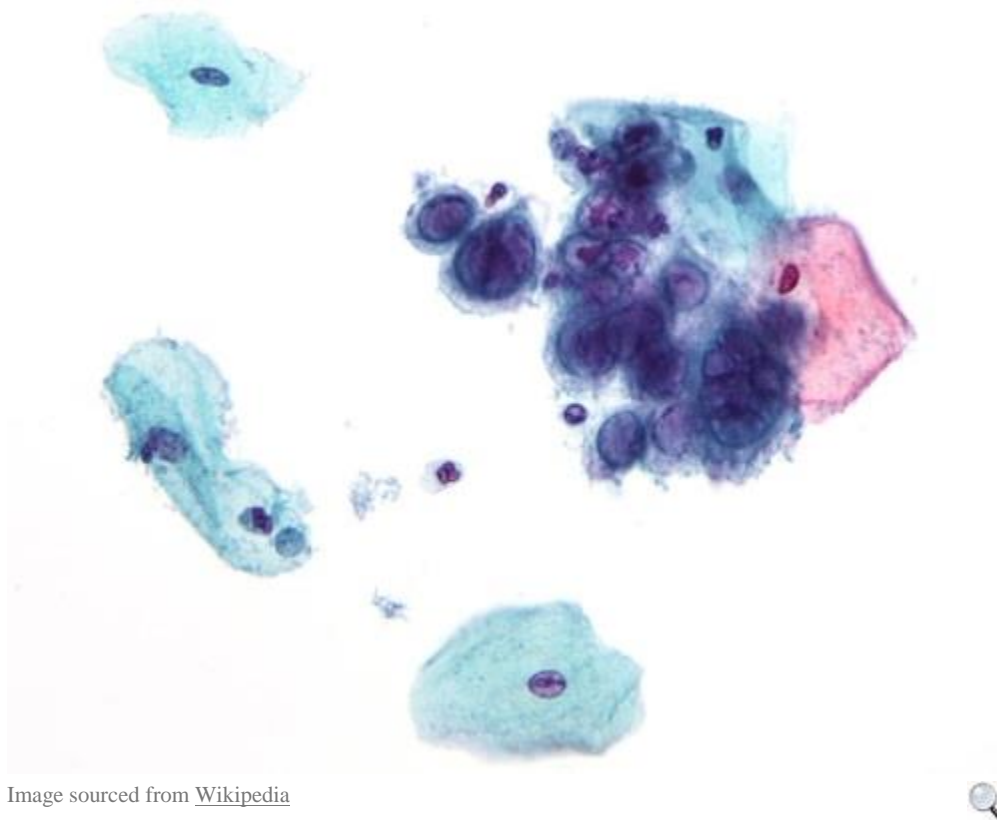


Image sourced from [Wikipedia](#)

Further Pap smear showing the cytopathic effect of HSV (multi-nucleation, ground glass & margined chromatin)



Question 100 of 143

Next

A 45-year-old man is diagnosed as having pulmonary tuberculosis. He currently lives in the UK and his sputum is positive for acid-fast bacilli. His past medical history includes hypertension for which he takes bendroflumethiazide and amlodipine. Which of the following combination of medications should he be taking initially?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Rifampicin, isoniazid, pyrazinamide and ethambutol |
| <input type="radio"/> | B. Isoniazid, pyrazinamide and ethambutol |
| <input type="radio"/> | C. Rifampicin, isoniazid and pyrazinamide |

<input type="radio"/>	D. Rifampicin, isoniazid, pyrazinamide, ethambutol and streptomycin
<input type="radio"/>	E. Rifampicin and isoniazid

[Next question](#)

Tuberculosis: drug therapy

The standard therapy for treating **active tuberculosis** is:

Initial phase - first 2 months (RIPE)

- Rifampicin
- Isoniazid
- Pyrazinamide
- Ethambutol (the 2006 NICE guidelines now recommend giving a 'fourth drug' such as ethambutol routinely - previously this was only added if drug-resistant tuberculosis was suspected)

Continuation phase - next 4 months

- Rifampicin
- Isoniazid

The treatment for **latent tuberculosis** is isoniazid alone for 6 months

Patients with **meningeal tuberculosis** are treated for a prolonged period (at least 12 months) with the addition of steroids

Directly observed therapy with a three times a week dosing regimen may be indicated in certain groups, including:

- homeless people with active tuberculosis
- patients who are likely to have poor concordance
- all prisoners with active or latent tuberculosis



Question 101 of 143

Next

A 15-year-old boy is diagnosed with glandular fever. What is the most appropriate advice to give regarding playing sports?



<input type="radio"/>	A. Can play contact sports as normal
<input type="radio"/>	B. Avoid contact sports for 2 weeks after having glandular fever if clinical evidence of splenomegaly
<input type="radio"/>	C. Avoid contact sports for 2 weeks after having glandular fever
<input checked="" type="radio"/>	D. Avoid contact sports for 8 weeks after having glandular fever
<input type="radio"/>	E. Avoid contact sports for 8 weeks after having glandular fever if clinical evidence of splenomegaly

Next question

Glandular fever: avoid contact sports for 8 weeks

Clinical examination is not sensitive enough to screen for splenomegaly

Infectious mononucleosis

Infectious mononucleosis (glandular fever) is caused by the Epstein-Barr virus (also known as human herpesvirus 4, HHV-4). It is most common in adolescents and young adults.

Features

- sore throat
- lymphadenopathy
- pyrexia
- malaise, anorexia, headache
- palatal petechiae
- splenomegaly - occurs in around 50% of patients and may rarely predispose to splenic rupture
- hepatitis
- presence of 50% lymphocytes with at least 10% atypical lymphocytes

- haemolytic anaemia secondary to cold agglutins (IgM)
- a maculopapular, pruritic rash develops in around 99% of patients who take ampicillin/amoxicillin whilst they have infectious mononucleosis

Diagnosis

- heterophil antibody test (Monospot test)

Management is supportive and includes:

- rest during the early stages, drink plenty of fluid, avoid alcohol
- simple analgesia for any aches or pains
- consensus guidance in the UK is to avoid playing contact sports for 8 weeks after having glandular fever to reduce the risk of splenic rupture



Question 102 of 143

Next

You are doing the six week check on a baby boy. His mother mentions that she has heard about a meningitis B vaccine and asks about it's availability. What is the most appropriate response?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. The meningitis B vaccine has been rejected by the Joint Committee on Vaccination and Immunisation (JCVI) and is therefore not recommended |
| <input type="radio"/> | B. The meningitis B vaccine has been rejected by the JCVI but may be obtained privately |
| <input checked="" type="radio"/> | C. The JCVI has recommended the introduction of the meningitis B vaccine to infants but it has not yet been implemented |
| <input type="radio"/> | D. The meningitis B vaccine is already part of the routine immunisation programme |
| <input type="radio"/> | E. There is currently no effective meningitis B vaccine |

Next question

Meningitis B vaccine

Children in the UK have been routinely immunised against serotypes A & C of meningococcus for many years. As a result meningococcal B has become the most common cause of bacterial meningitis in the UK. A vaccination against meningococcal B (Bexsero) has recently been developed and introduced to the UK market.

The Joint Committee on Vaccination and Immunisation (JCVI) initially rejected the use of Bexsero after doing a cost-benefit analysis. This decision was effectively reversed in March 2014 when the JCVI recommended that the vaccine be offered to babies at 2, 4 and 12 months of age 'as long as the Department of Health can obtain the vaccine at a cost effective price'. It is therefore likely to be many months before Bexsero is part of the routine immunisation schedule.

Bexsero will also be available on the NHS for patients at high risk of meningococcal disease, such as people with asplenia, splenic dysfunction or complement disorder.



Question 103 of 143

Next

A 7-year-old boy is admitted to hospital after presenting with fever, headache and neck stiffness. A diagnosis of pneumococcal meningitis is made. There are no other reports of meningitis in the local area over the past 4 weeks.

How should the close contacts of this boy be managed?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. No action is needed |
| <input type="radio"/> | B. Pneumococcal vaccine booster |
| <input type="radio"/> | C. Oral amoxicillin |
| <input type="radio"/> | D. Oral amoxicillin + pneumococcal vaccine booster |
| <input type="radio"/> | E. Oral ciprofloxacin |

Carriage of pneumococcus is extremely common and no antibiotic prophylaxis is generally required in this situation. There are however exceptions to this if a 'cluster' of cases develop - please the HPA link for more details.

Meningitis: management

Investigations suggested by NICE

- full blood count
- CRP
- coagulation screen
- blood culture
- whole-blood PCR
- blood glucose
- blood gas

Lumbar puncture if no signs of raised intracranial pressure

Management

All patients should be transferred to hospital urgently. If patients are in a pre-hospital setting (for example a GP surgery) and meningococcal disease is suspected then intramuscular benzylpenicillin may be given, as long as this doesn't delay transit to hospital.

BNF recommendations on antibiotics

Scenario	BNF recommendation
Initial empirical therapy aged < 3 months	Intravenous cefotaxime + amoxicillin
Initial empirical therapy aged 3 months - 50 years	Intravenous cefotaxime
Initial empirical therapy aged > 50 years	Intravenous cefotaxime + amoxicillin
Meningococcal meningitis	Intravenous benzylpenicillin or cefotaxime
Pneumococcal meningitis	Intravenous cefotaxime

Scenario	BNF recommendation
Meningitis caused by <i>Haemophilus influenzae</i>	Intravenous cefotaxime
Meningitis caused by <i>Listeria</i>	Intravenous amoxicillin + gentamicin

If the patient has a history of immediate hypersensitivity reaction to penicillin or to cephalosporins the BNF recommends using chloramphenicol.

Management of contacts

- prophylaxis needs to be offered to household and close contacts of patients affected with meningococcal meningitis
- oral ciprofloxacin or rifampicin or may be used. The Health Protection Agency (HPA) guidelines now state that whilst either may be used ciprofloxacin is the drug of choice as it is widely available and only requires one dose
- the risk is highest in the first 7 days but persists for at least 4 weeks
- meningococcal vaccination should be offered to close contacts when serotype results are available, including booster doses to those who had the vaccine in infancy
- for pneumococcal meningitis no prophylaxis is generally needed. There are however exceptions to this. If a cluster of cases of pneumococcal meningitis occur the HPA have a protocol for offering close contacts antibiotic prophylaxis. Please see the link for more details



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Next

Which one of the following is a notifiable disease in the UK?

<input type="radio"/>	A. <i>Listeria</i>
<input checked="" type="radio"/>	B. Creutzfeldt-Jakob disease
<input checked="" type="radio"/>	C. Tuberculosis
<input type="radio"/>	D. HIV



E. Mycoplasma pneumonia

[Next question](#)

Notifiable diseases

Below is a list of notifiable diseases in the UK. The 'proper officer' of the Local Authority (usually a consultant in communicable disease) needs to be notified. They in turn will notify the Health Protection Agency on a weekly basis.

Notable exceptions include:

- HIV

In April 2010 the following diseases were removed from the list:

- Dysentery
- Ophthalmia neonatorum
- Leptospirosis
- Relapsing fever

Therefore, the current notifiable diseases are:

- Acute encephalitis
- Acute infectious hepatitis
- Acute meningitis
- Acute poliomyelitis
- Anthrax
- Botulism
- Brucellosis
- Cholera
- Diphtheria
- Enteric fever (typhoid or paratyphoid fever)
- Food poisoning
- Haemolytic uraemic syndrome (HUS)
- Infectious bloody diarrhoea
- Invasive group A streptococcal disease

- Legionnaires Disease
- Leprosy
- Malaria
- Measles
- Meningococcal septicaemia
- Mumps
- Plague
- Rabies
- Rubella
- SARS
- Scarlet fever
- Smallpox
- Tetanus
- Tuberculosis
- Typhus
- Viral haemorrhagic fever (VHF)
- Whooping cough
- Yellow fever



Question 105 of 143

Next

A 19-year-old medical student undergoes primary immunisation against hepatitis B. His post immunisation bloods are reported as follows:

Anti-HBs	< 10 mIU/ml
----------	-------------

What is the most appropriate course of action?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Give one further dose of hepatitis B vaccine |
| <input type="radio"/> | B. Do a HIV test |
| <input checked="" type="radio"/> | C. Test for current or past hepatitis B + repeat course (i.e. 3 doses) of vaccine |
| <input type="radio"/> | D. Give two further doses of hepatitis B vaccine |



E. Give a course of hepatitis B immune globulin (HBIG) + one further dose of hepatitis B vaccine

Next question

Hepatitis B

Hepatitis B is a double-stranded DNA hepadnavirus and is spread through exposure to infected blood or body fluids, including vertical transmission from mother to child. The incubation period is 6-20 weeks.

The features of hepatitis B include fever, jaundice and elevated liver transaminases.

Complications of hepatitis B infection

- chronic hepatitis (5-10%)
- fulminant liver failure (1%)
- hepatocellular carcinoma
- glomerulonephritis
- polyarteritis nodosa
- cryoglobulinaemia

Immunisation against hepatitis B (please see the Greenbook link for more details)

- contains HBsAg adsorbed onto aluminium hydroxide adjuvant and is prepared from yeast cells using recombinant DNA technology
- most schedules give 3 doses of the vaccine with a recommendation for a one-off booster 5 years following the initial primary vaccination
- at risk groups who should be vaccinated include: healthcare workers, intravenous drug users, sex workers, close family contacts of an individual with hepatitis B, individuals receiving blood transfusions regularly, chronic kidney disease patients who may soon require renal replacement therapy, prisoners, chronic liver disease patients
- around 10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine. Risk factors include age over 40 years, obesity, smoking, alcohol excess and immunosuppression
- testing for anti-HBs is only recommended for those at risk of occupational exposure (i.e. Healthcare workers) and patients with chronic kidney disease. In these patients anti-HBs levels should be checked 1-4 months after primary immunisation
- the table below shows how to interpret anti-HBs levels:

Anti-HBs level (mIU/ml)	Response
> 100	Indicates adequate response, no further testing required. Should still receive booster at 5 years
10 - 100	Suboptimal response - one additional vaccine dose should be given. If immunocompetent no further testing is required
< 10	Non-responder. Test for current or past infection. Give further vaccine course (i.e. 3 doses again) with testing following. If still fails to respond then HBIG would be required for protection if exposed to the virus

Management of hepatitis B

- pegylated interferon-alpha used to be the only treatment available. It reduces viral replication in up to 30% of chronic carriers. A better response is predicted by being female, < 50 years old, low HBV DNA levels, non-Asian, HIV negative, high degree of inflammation on liver biopsy
- whilst NICE still advocate the use of pegylated interferon first-line other antiviral medications are increasingly used with an aim to suppress viral replication (not in a dissimilar way to treating HIV patients)
- examples include tenofovir and entecavir



Question 106 of 143

Next

You are counselling a 26-year-old man who has recently had a positive HIV test. His most recent CD4 count is 650 cells/mm³. Which one of the following vaccinations is contraindicated?



- ☒ A. Oral poliomyelitis
- ☐ B. Yellow fever

- ☐ C. Pneumococcus
- ☐ D. Parenteral poliomyelitis
- ☐ E. Measles, Mumps, Rubella

Next question

HIV: immunisation

The Department of Health 'Greenbook' on immunisation defers to the British HIV Association for guidelines relating to immunisation of HIV-infected adults



Vaccines that can be used in all HIV-infected adults	Vaccines that can be used if CD4 > 200	Contraindicated in HIV-infected adults
Hepatitis A Hepatitis B <i>Haemophilus influenzae</i> B (Hib) Influenza-parenteral Japanese encephalitis Meningococcus-MenC Meningococcus-ACWY I Pneumococcus-PPV23 Poliomyelitis-parenteral (IPV) Rabies Tetanus-Diphtheria (Td)	Measles, Mumps, Rubella (MMR) Varicella Yellow Fever	Cholera CVD103-HgR Influenza-intranasal Poliomyelitis-oral (OPV) Tuberculosis (BCG)



Question 107 of 143

Next

A 31-year-old woman who is known to be HIV positive presents following a positive pregnancy test. Her last menstrual period was 6 weeks ago. The last CD4 count was $420 \times 10^6/l$ and she does not take any antiretroviral therapy. What is the most appropriate management with regards to antiretroviral therapy?

	<input type="radio"/>	A. Check CD4 at 12 weeks and initiate antiretroviral therapy if CD4 count is less than $350 \times 10^6/l$
	<input type="radio"/>	B. Do not give antiretroviral therapy
	<input checked="" type="radio"/>	C. Start antiretroviral therapy at 20-32 weeks
	<input type="radio"/>	D. Start antiretroviral therapy at 10-12 weeks
	<input type="radio"/>	E. Start antiretroviral therapy immediately

Next question

Whilst the RCOG guidelines recommend 28-32 weeks the BHIVA suggest a slightly earlier gestation may be suitable depending on individual circumstances. The most suitable answer is therefore 20-32 weeks.

HIV and pregnancy

With the increased incidence of HIV infection amongst the heterosexual population there are an increasing number of HIV positive women giving birth in the UK. In London the incidence may be as high as 0.4% of pregnant women. The aim of treating HIV positive women during pregnancy is to minimise harm to both the mother and fetus, and to reduce the chance of vertical transmission.

Guidelines regularly change on this subject and most recent guidelines can be found using the links provided.

Factors which reduce vertical transmission (from 25-30% to 2%)

- maternal antiretroviral therapy
- mode of delivery (caesarean section)
- neonatal antiretroviral therapy
- infant feeding (bottle feeding)

Screening

- NICE guidelines recommend offering HIV screening to all pregnant women

Antiretroviral therapy

- all pregnant women should be offered antiretroviral therapy regardless of whether they were taking it previously
- if women are not currently taking antiretroviral therapy the RCOG recommend that it is commenced between 28 and 32 weeks of gestation and should be continued intrapartum. BHIVA recommend that antiretroviral therapy may be started at an earlier gestation depending upon the individual situation

Mode of delivery

- vaginal delivery is recommended if viral load is less than 50 copies/ml at 36 weeks, otherwise caesarian section is recommended
- a zidovudine infusion should be started four hours before beginning the caesarean section

Neonatal antiretroviral therapy

- zidovudine is usually administered orally to the neonate if maternal viral load is <50 copies/ml. Otherwise triple ART should be used. Therapy should be continued for 4-6 weeks.

Infant feeding

- in the UK all women should be advised not to breast feed



Question 108 of 143

Next

Which one of the following statements regarding hepatitis B is correct?



<input type="radio"/>	A. Ribavirin is the treatment of choice for chronic hepatitis B
<input type="radio"/>	B. All patient immunised against hepatitis B require an anti-HBs check to assess their response to the vaccine
<input checked="" type="radio"/>	C. 10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine

<input type="radio"/>	D. The vaccine is of the live-attenuated type
<input type="radio"/>	E. An anti-HBs level of 20 mIU/ml indicates an adequate response to the vaccine

Next question

Only those at risk of occupational exposure (i.e. Healthcare workers) and patients with chronic kidney disease require an anti-HBs check.

Hepatitis B

Hepatitis B is a double-stranded DNA hepadnavirus and is spread through exposure to infected blood or body fluids, including vertical transmission from mother to child. The incubation period is 6-20 weeks.

The features of hepatitis B include fever, jaundice and elevated liver transaminases.

Complications of hepatitis B infection

- chronic hepatitis (5-10%)
- fulminant liver failure (1%)
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- polyarteritis nodosa
- cryoglobulinaemia

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- around 10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine. Risk factors include age over 40 years, obesity, smoking, alcohol excess and immunosuppression

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Management of hepatitis B

- pegylated interferon-alpha used to be the only treatment available. It reduces viral replication in up to 30% of chronic carriers. A better response is predicted by being female, < 50 years old, low HBV DNA levels, non-Asian, HIV negative, high degree of inflammation on liver biopsy
- whilst NICE still advocate the use of pegylated interferon first-line other antiviral medications are increasingly used with an aim to suppress viral replication (not in a dissimilar way to treating HIV patients)
- examples include tenofovir and entecavir



Question 109 of 143

Next

Please look at a close-up of the scalp of a 7-year-old-girl



© Image used on license from [DermNet NZ](#)



Which one of the following is not a recommended management option?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Isopropyl myristate and cyclomethicone |
| <input type="radio"/> | B. Wet combing |
| <input type="radio"/> | C. Dimeticone |
| <input checked="" type="radio"/> | D. Malathion |
| <input checked="" type="radio"/> | E. Benzyl benzoate |

[Next question](#)

Head lice

Head lice (also known as pediculosis capitis or 'nits') is a common condition in children caused by the parasitic insect *Pediculus capitis*, which lives on and among the hair of the scalp of humans

Diagnosis

- fine-toothed combing of wet or dry hair

Management

- treatment is only if living lice are found
- a choice of treatments should be offered - malathion, wet combing, dimeticone, isopropyl myristate and cyclomethicone

School exclusion is not advised for children with head lice



Question 110 of 143

Next

A 66-year-old man is diagnosed with chronic obstructive pulmonary disease (COPD). He already receives the annual influenza vaccine. What should happen with regards to the pneumococcal vaccine?



A. He does not require the vaccine



B. He should be given it as a one-off



C. He requires the vaccine on an annual basis



D. He requires the vaccine once every 3 years



E. He requires the vaccine once every 5 years

Next question

Adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years.

Pneumococcal vaccine

There are two type of pneumococcal vaccine currently in use:

- pneumococcal conjugate vaccine (PCV)

- pneumococcal polysaccharide vaccine (PPV)

The PCV is given to children as part of their routine immunisations (at 2, 4 and 13 months).

The PPV is offered to all adults over the age of 65 years, to patients with chronic conditions such as COPD and to those who have had a splenectomy (see below).

Groups who should be vaccinated:

- asplenia or splenic dysfunction
- chronic respiratory disease: COPD, bronchiectasis, cystic fibrosis, interstitial lung disease. Asthma is only included if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'
- chronic heart disease: ischaemic heart disease if requiring medication or follow-up, heart failure, congenital heart disease. Controlled hypertension is not an indication for vaccination
- chronic kidney disease
- chronic liver disease: including cirrhosis and chronic hepatitis
- diabetes mellitus if requiring medication
- immunosuppression (either due to disease or treatment). This includes patients with any stage of HIV infection
- cochlear implants
- patients with cerebrospinal fluid leaks

Adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years.



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Next

An 18-year-old female presents with post-coital bleeding. As part of your management you consider testing the patient for *Chlamydia*. What percentage of young women in the UK have *Chlamydia*?



A. Approximately 0.5%

- | | |
|----------------------------------|----------------------|
| <input type="radio"/> | B. Approximately 2% |
| <input type="radio"/> | C. Approximately 5% |
| <input checked="" type="radio"/> | D. Approximately 10% |
| <input type="radio"/> | E. Approximately 25% |

Next question

Chlamydia is common, affecting around 1 in 10 young women

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

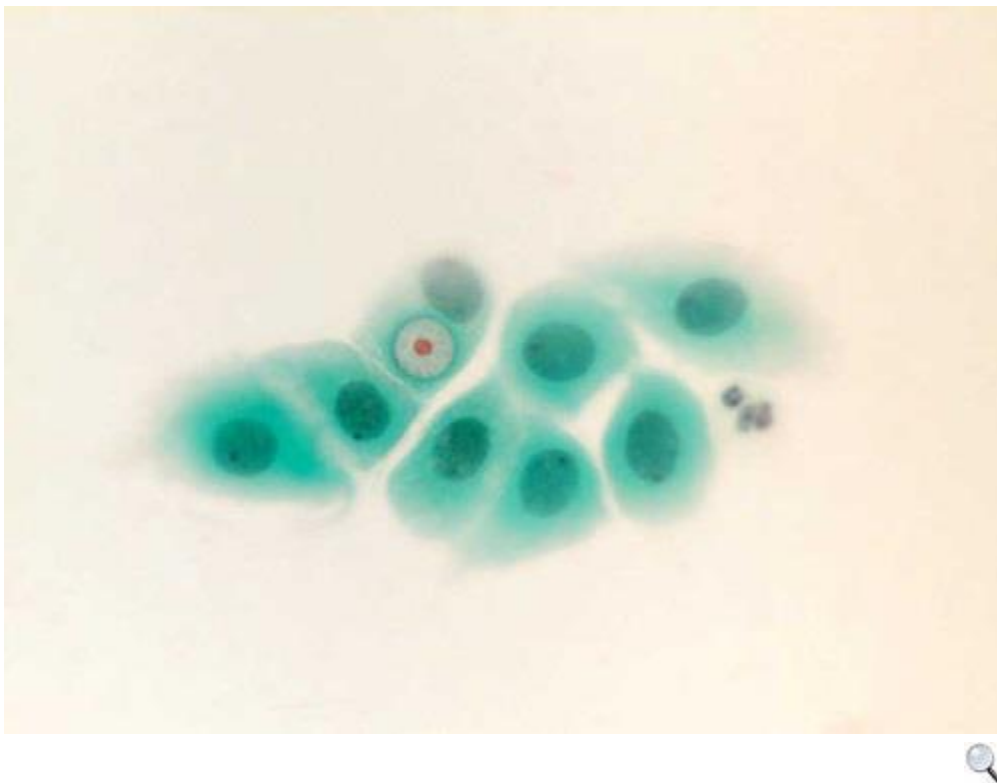
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

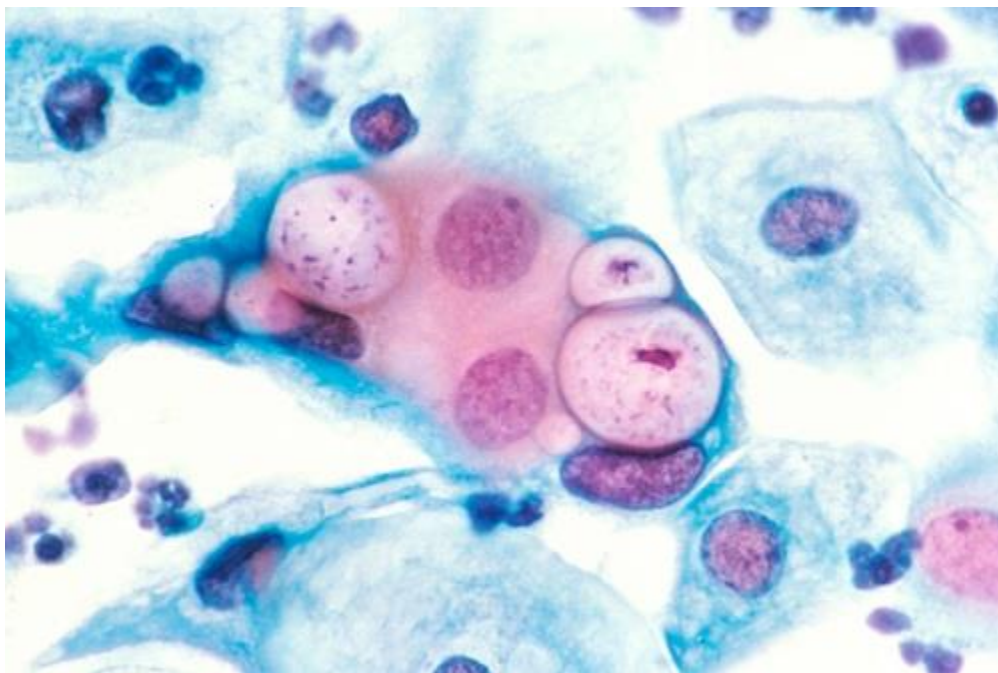


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



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Next

A 29-year-old woman develops severe vomiting four hours after having lunch at a local restaurant. What is the most likely causative organism?



- ☐ A. *Escherichia coli*
- ☐ B. *Shigella*
- ☐ C. *Campylobacter*
- ☐ D. *Salmonella*
- ☒ E. *Staphylococcus aureus*

Next question

The short incubation period and severe vomiting point to a diagnosis of *Staphylococcus aureus* food poisoning.

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea

Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks



Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



The mother of a 10-year-old boy who has asthma asks for advice. She wants to know if he should have the annual influenza vaccine. His asthma is currently well controlled on a combination of salbutamol, beclometasone and salmeterol. He has had no courses of oral steroids in the past 12 months. What is the most appropriate advice?

- | | | |
|---|----------------------------------|---|
|  | <input type="radio"/> | A. He should have two influenza vaccinations spaced 4-6 weeks apart |
| | <input type="radio"/> | B. He does not need the vaccine |
| | <input type="radio"/> | C. He should have the vaccine at least once every 5 years |
| | <input type="radio"/> | D. If he has had the influenza vaccine before he does not need it again |
|  | <input checked="" type="radio"/> | E. He should have one influenza vaccination |

Next question

As he uses an inhaled corticosteroid he should be offered the vaccine. Only children aged 2-9 years who have not received influenza vaccine before should receive a second dose of vaccine at least 4 weeks later.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)

- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



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Next

Which one of the following statements regarding the shingles vaccine (Zostavax) is correct?



- | | |
|-----------------------|---|
| <input type="radio"/> | A. It causes chickenpox in around 1 in 500 individuals |
| <input type="radio"/> | B. It should be given to all 65-year-olds |
| <input type="radio"/> | C. The most common side-effect is a generalised myalgia |

- | | |
|------------------------------------|--|
| <input type="radio"/> | D. It is an inactivated preparation of the herpes zoster virus |
| ✓ <input checked="" type="radio"/> | E. It is given subcutaneously |

[Next question](#)

Herpes zoster

Shingles is an acute, unilateral, painful blistering rash caused by reactivation of the Varicella Zoster Virus (VZV).

The 'shingles vaccine'

In 2013 the NHS introduced a vaccine to boost the immunity of elderly people against herpes zoster. Some important points about the vaccine:

- will be offered to patients at the age of **70 years** (a catch-up programme will also be launched initially)
- is **live-attenuated** and given **sub-cutaneously**

As it is a live-attenuated vaccine the main contraindications are immunosuppression.

Side-effects

- injection site reactions
- less than 1 in 10,000 individuals will develop chickenpox

Management of shingles

Oral aciclovir is first-line. One of the main benefits of treatment is a reduction in the incidence of post-herpetic neuralgia.



Question 115 of 143

Next

A prison GP is bitten by a patient who is known to have hepatitis B. The GP has a documented full history of hepatitis B vaccination and was known to be a responder. What is the most appropriate action to reduce the chance of contracting hepatitis B?



- | | |
|-----------------------|---|
| <input type="radio"/> | A. Admit for intravenous interferon |
| <input type="radio"/> | B. Give hepatitis B immune globulin |
| <input type="radio"/> | C. Give hepatitis B immune globulin + hepatitis B vaccine booster |



D. Give hepatitis B vaccine booster



E. Give oral ribavirin for 4 weeks

[Next question](#)

Post-exposure prophylaxis

Hepatitis A

- Human Normal Immunoglobulin (HNIG) or hepatitis A vaccine may be used depending on the clinical situation

Hepatitis B

- HBsAg positive source: if the person exposed is a known responder to HBV vaccine then a booster dose should be given. If they are in the process of being vaccinated or are a non-responder they need to have hepatitis B immune globulin (HBIG) and the vaccine
- unknown source: for known responders the green book advises considering a booster dose of HBV vaccine. For known non-responders HBIG + vaccine should be given whilst those in the process of being vaccinated should have an accelerated course of HBV vaccine

Hepatitis C

- monthly PCR - if seroconversion then interferon +/- ribavirin

HIV

- a combination of oral antiretrovirals (e.g. Tenofovir, emtricitabine, lopinavir and ritonavir) as soon as possible (i.e. Within 1-2 hours, but may be started up to 72 hours following exposure) for 4 weeks
- serological testing at 12 weeks following completion of post-exposure prophylaxis
- reduces risk of transmission by 80%

Varicella zoster

- VZIG for IgG negative pregnant women/immunosuppressed

Estimates of transmission risk for single needlestick injury

Hepatitis B	20-30%
Hepatitis C	0.5-2%
HIV	0.3%



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Next

A 17-year-old man attends the local sexual health clinic. He has developed a large, keratinised genital wart on the shaft of his penis. This has been present for around three months but he has been too embarrassed to present before now. What is the most appropriate initial management?

- ☐ A. Topical aciclovir
- ☒ B. Cryotherapy
- ☐ C. Topical salicylic acid
- ☐ D. Electrocautery
- ☐ E. Topical podophyllum

Next question

Genital wart treatment

- multiple, non-keratinised warts: topical podophyllum
- solitary, keratinised warts: cryotherapy

As the wart is keratinised cryotherapy should be used initially.

Genital warts

Genital warts (also known as condylomata accuminata) are a common cause of attendance at genitourinary clinics. They are caused by the many varieties of the human papilloma virus HPV, especially types 6 & 11. It is now well established that HPV (primarily types 16,18 & 33) predisposes to cervical cancer.

Features

- small (2 - 5 mm) fleshy protuberances which are slightly pigmented
- may bleed or itch

Management

- topical podophyllum or cryotherapy are commonly used as first-line treatments depending on the location and type of lesion. Multiple, non-keratinised warts are generally best treated with topical agents whereas solitary, keratinised warts respond better to cryotherapy
- imiquimod is a topical cream which is generally used second line
- genital warts are often resistant to treatment and recurrence is common although the majority of anogenital infections with HPV clear without intervention within 1-2 years



Question 117 of 143

Next

A 28-year-old man who has recently emigrated from Nigeria presents with a penile ulcer. It initially started as a papule which later progressed to become a painful ulcer 15mm in diameter with an undermined ragged edge. Examination of the testes was unremarkable but tender inguinal lymphadenopathy was noted. What is the most likely diagnosis?



- | | |
|----------------------------------|-----------------------------|
| <input checked="" type="radio"/> | A. Chancroid |
| <input type="radio"/> | B. Lymphogranuloma venereum |

<input type="radio"/>	C. Syphilis
<input type="radio"/>	D. Herpes simplex infection
<input type="radio"/>	E. Granuloma inguinale

Next question

Genital ulcers

- painful: herpes much more common than chancroid
- painless: syphilis more common than lymphogranuloma venereum

A diagnosis of chancroid is more likely than lymphogranuloma venereum as the ulcer is painful. Whilst herpes simplex is obviously more common the description of the ulcer is very characteristic of chancroid. Painful inguinal lymphadenopathy is present in around 50% of patients.

STI: ulcers

Genital herpes is most often caused by the herpes simplex virus (HSV) type 2 (cold sores are usually due to HSV type 1). Primary attacks are often severe and associated with fever whilst subsequent attacks are generally less severe and localised to one site

Syphilis is a sexually transmitted infection caused by the spirochaete *Treponema pallidum*. Infection is characterised by primary, secondary and tertiary stages. A painless ulcer (chancre) is seen in the primary stage. The incubation period= 9-90 days

Chancroid is a tropical disease caused by *Haemophilus ducreyi*. It causes painful genital ulcers associated with unilateral, painful inguinal lymph node enlargement. The ulcers typically have a sharply defined, ragged, undermined border.

Lymphogranuloma venereum (LGV) is caused by *Chlamydia trachomatis*. Typically infection comprises of three stages

- stage 1: small painless pustule which later forms an ulcer
- stage 2: painful inguinal lymphadenopathy
- stage 3: proctocolitis

LGV is treated using doxycycline.

Other causes of genital ulcers

- Behcet's disease
- carcinoma
- granuloma inguinale: *Klebsiella granulomatis**

*previously called *Calymmatobacterium granulomatis*



Question 118 of 143

Next

A 9-month-old girl is generally unwell with a low-grade pyrexia, oral ulcers and the following appearance of her feet:



© Image used on license from [DermNet NZ](#)



Which one of the following is most likely to be responsible for this presentation?



A. Measles

- | | |
|------------------------------------|--------------------------------|
| <input type="radio"/> | B. Human herpesvirus 8 (HHV-8) |
| <input type="radio"/> | C. Parvovirus B19 |
| <input type="radio"/> | D. Vasculitis |
| ✓ <input checked="" type="radio"/> | E. Coxsackie A16 |

Next question

Hand, foot and mouth disease

Hand, foot and mouth disease is a self-limiting condition affecting children. It is caused by the intestinal viruses of the Picornaviridae family (most commonly coxsackie A16 and enterovirus 71). It is very contagious and typically occurs in outbreaks at nursery

Clinical features

- mild systemic upset: sore throat, fever
- oral ulcers
- followed later by vesicles on the palms and soles of the feet



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Management

- general advice about hydration and analgesia
- reassurance no link to disease in cattle
- children do not need to be excluded from school*

*The HPA recommends that children who are unwell should be kept off school until they feel better. They also advise that you contact them if you suspect that there may be a large outbreak.



Question 119 of 143

Next

A 30-year-old woman who is 38 weeks pregnant presents with dysuria and urinary frequency. A urine dipstick is positive for nitrites and leucocytes. Of the options given, what is the most suitable management?



A. Ciprofloxacin

☒

B. Cefalexin

☐

C. Advise to increase fluid intake and take cranberry juice.

☐

D. Doxycycline

☐

E. Nitrofurantoin

Next question

Amoxicillin is also recommended in this situation. Nitrofurantoin should be avoided near term as it may cause neonatal haemolysis but it may be used earlier in the pregnancy.

This lady is highly likely to have a urinary tract infection so advising her just to use cranberry juice is inappropriate.

Urinary tract infection in adults: management

Lower urinary tract infections in non-pregnant women

- local antibiotic guidelines should be followed if available
- 2012 SIGN guidelines recommend trimethoprim or nitrofurantoin for 3 days

Pregnant women with symptomatic bacteriuria should be treated with an antibiotic for 7 days. A urine culture should be sent. For asymptomatic pregnant women:

- a urine culture should be performed routinely at the first antenatal visit
- if positive, a second urine culture should be sent to confirm the presence of bacteriuria
- SIGN recommend to treat asymptomatic bacteriuria detected during pregnancy with an antibiotic
- a 7 day course of antibiotics should be given
- a further urine culture should be sent following completion of treatment as a test of cure

For patients with sign of acute pyelonephritis hospital admission should be considered

- local antibiotic guidelines should be followed if available
- the BNF currently recommends a broad-spectrum cephalosporin or a quinolone for 10-14 days



Question 120 of 143

Next

A 24-year-old woman is reviewed in the genitourinary medicine clinic. She presented with vaginal discharge and dysuria. Microscopy of an endocervical swab showed a Gram-negative coccus that was later identified as *Neisseria gonorrhoea*. This is her third episode of gonorrhoea in the past two years. What is the most likely complication from repeated infection?



- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Lymphogranuloma venereum |
| <input checked="" type="radio"/> | B. Cervical cancer |
| <input type="radio"/> | C. Arthropathy |
| <input checked="" type="radio"/> | D. Infertility |
| <input type="radio"/> | E. Uterine abscess |

Next question

Infertility secondary to pelvic inflammatory disease (PID) is the most common complication of gonorrhoea. It is the second most common cause of PID after *Chlamydia*. Arthropathy may occur but it is far less common.

Lymphogranuloma venereum is caused by *Chlamydia trachomatis*.

Gonorrhoea

Gonorrhoea is caused by the Gram negative diplococcus *Neisseria gonorrhoea*. Acute infection can occur on any mucous membrane surface, typically genitourinary but also rectum and pharynx. The incubation period of gonorrhoea is 2-5 days

Features

- males: urethral discharge, dysuria
- females: cervicitis e.g. leading to vaginal discharge
- rectal and pharyngeal infection is usually asymptomatic

Local complications that may develop include urethral strictures, epididymitis and salpingitis (hence may lead to infertility). Disseminated infection may occur - see below

Management

- ciprofloxacin used to be the treatment of choice. However, there is increased resistance to ciprofloxacin and therefore cephalosporins are now used
- the 2011 British Society for Sexual Health and HIV (BASHH) guidelines recommend ceftriaxone 500 mg intramuscularly as a single dose with azithromycin 1 g oral as a single dose. The azithromycin is thought to act synergistically with ceftriaxone and is also useful for eradicating any co-existent Chlamydia infections
- if ceftriaxone is refused or contraindicated other options include cefixime 400mg PO (single dose)

Disseminated gonococcal infection (DGI) and gonococcal arthritis may also occur, with gonococcal infection being the most common cause of septic arthritis in young adults. The pathophysiology of DGI is not fully understood but is thought to be due to haematogenous spread from mucosal infection (e.g. Asymptomatic genital infection). Initially there may be a classic triad of symptoms: tenosynovitis, migratory polyarthritis and dermatitis. Later complications include septic arthritis, endocarditis and perihepatitis (Fitz-Hugh-Curtis syndrome)

Key features of disseminated gonococcal infection

- tenosynovitis
- migratory polyarthritis
- dermatitis (lesions can be maculopapular or vesicular)



Question 121 of 143

Next

Which one of the following investigations is essential prior to starting anti-tuberculosis therapy?



- | | |
|----------------------------------|--------------------------------|
| <input checked="" type="radio"/> | A. Liver functions tests |
| <input type="radio"/> | B. Urine for acid-fast bacilli |

<input type="radio"/>	C. Vitamin B6 level
<input type="radio"/>	D. Blood glucose
<input type="radio"/>	E. Full blood count

Next question

The British Thoracic Society have published guidelines on the management of tuberculosis. Liver functions tests should be checked in all cases and monitored throughout treatment. Visual acuity and renal function should also be checked prior to starting ethambutol

Tuberculosis: drug side-effects and mechanism of action

Rifampicin

- mechanism of action: inhibits bacterial DNA dependent RNA polymerase preventing transcription of DNA into mRNA
- potent liver enzyme inducer
- hepatitis, orange secretions
- flu-like symptoms

Isoniazid

- mechanism of action: inhibits mycolic acid synthesis
- peripheral neuropathy: prevent with pyridoxine (Vitamin B6)
- hepatitis, agranulocytosis
- liver enzyme inhibitor

Pyrazinamide

- mechanism of action: converted by pyrazinamidase into pyrazinoic acid which in turn inhibits fatty acid synthase (FAS) I
- hyperuricaemia causing gout
- arthralgia, myalgia
- hepatitis

Ethambutol

- mechanism of action: inhibits the enzyme arabinosyl transferase which polymerizes arabinose into arabinan
- optic neuritis: check visual acuity before and during treatment
- dose needs adjusting in patients with renal impairment



Question 122 of 143

Next

A 33-year-old known to be HIV positive presents with a 2 day history of diarrhoea. What is the most likely cause of his diarrhoea?



<input type="radio"/>	A. Herpes simplex enteritis
<input checked="" type="radio"/>	B. Cryptosporidium
<input type="radio"/>	C. Histoplasmosis
<input type="radio"/>	D. <i>Shigella</i>
<input type="radio"/>	E. <i>Mycobacterium avium intracellulare</i>

Next question

Cryptosporidium is the most common cause of diarrhoea in patients with HIV infection. Histoplasmosis may cause respiratory infection in HIV patients. *Mycobacterium avium intracellulare* and giardiasis are known causes of diarrhoea in HIV patients but are not as common as Cryptosporidium infection

HIV: diarrhoea

Diarrhoea is common in patients with HIV. This may be due to the effects of the virus itself (HIV enteritis) or opportunistic infections

Possible causes

- Cryptosporidium + other protozoa (most common)
- Cytomegalovirus
- *Mycobacterium avium intracellulare*
- Giardia

Cryptosporidium is the most common infective cause of diarrhoea in HIV patients. It is an intracellular protozoa and has an incubation period of 7 days. Presentation is very variable, ranging from mild to severe diarrhoea. A modified Ziehl-Neelsen stain (acid-fast stain) of the stool may reveal the characteristic red cysts of Cryptosporidium. Treatment is difficult, with the mainstay of management being supportive therapy*

Mycobacterium avium intracellulare is an atypical mycobacteria seen with the CD4 count is below 50. Typical features include fever, sweats, abdominal pain and diarrhoea. There may be hepatomegaly and deranged LFTs. Diagnosis is made by blood cultures and bone marrow examination. Management is with rifabutin, ethambutol and clarithromycin

*nitazoxanide is licensed in the US for immunocompetent patients



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Next

A 26-year-old man returns to the genito-urinary medicine clinic. He is a known intravenous drug user. Five days ago he was seen with a urethral discharge. A swab taken in the clinic showed a Gram-negative diplococcus and treatment with IM ceftriaxone was given. Unfortunately his symptoms have not resolved. What is the most likely explanation?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Gonorrhoea-resistant to ceftriaxone |
| <input checked="" type="radio"/> | B. Co-existent <i>Candida</i> infection |
| <input type="radio"/> | C. HIV infection |
| <input type="radio"/> | D. Co-existent syphilis infection |
| <input checked="" type="radio"/> | E. Co-existent <i>Chlamydia</i> infection |

Next question

Co-existent infection with *Chlamydia* is extremely common in patients with gonorrhoea.

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

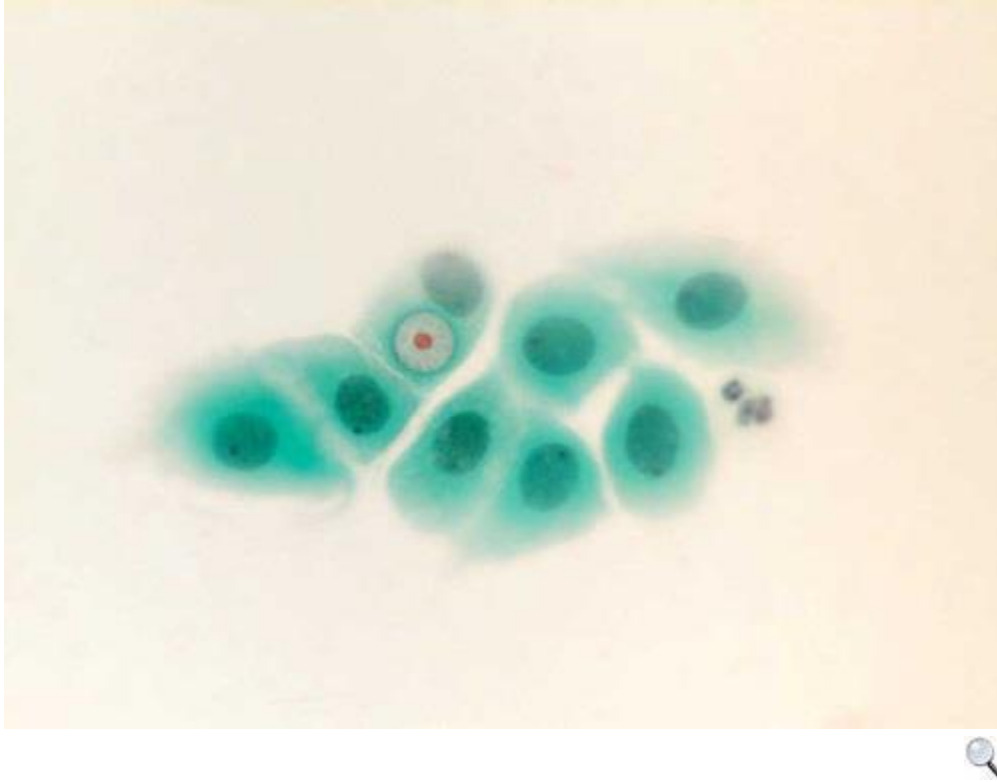
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

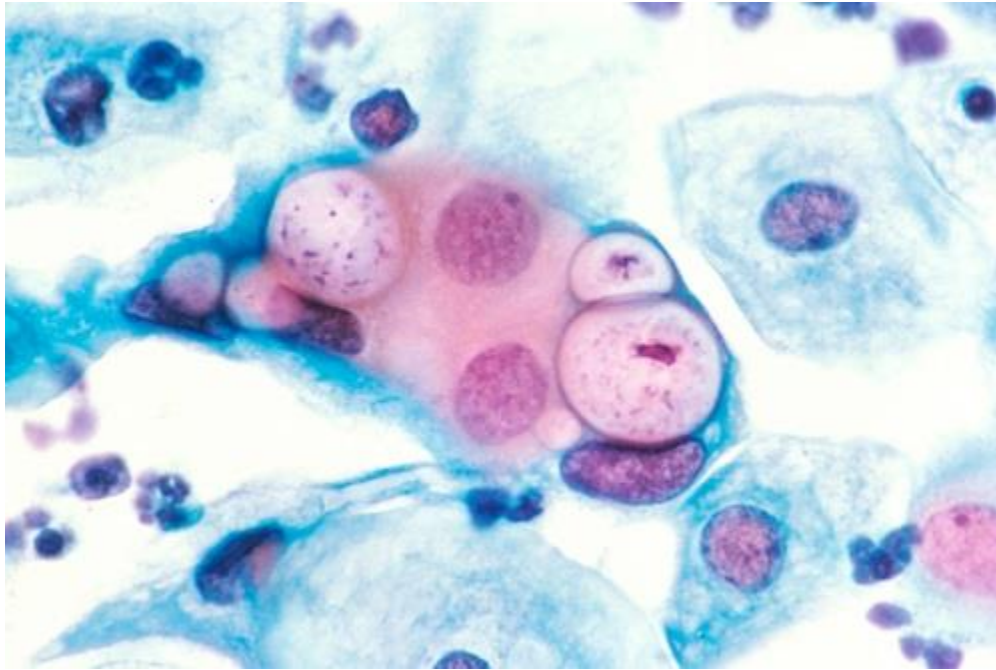


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&



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Next

A 39-year-old female who has recently emigrated from sub-Saharan Africa is screened for tuberculosis. She reports being fit and well with no past medical history and has never had a BCG vaccination. Her chest x-ray is normal but she has a Mantoux test which is positive. An interferon gamma test is also performed which is positive. A HIV test is requested which is negative. A diagnosis of latent tuberculosis is suspected. Which one of the following treatments is she most likely to be offered?



- ☒ A. Isoniazid for 6 months
- ☐ B. Rifampicin, isoniazid, pyrazinamide and ethambutol for 6 months

<input type="radio"/>	C. Observe
<input type="radio"/>	D. Rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months then step down to rifampicin and isoniazid for 4 months
<input type="radio"/>	E. Rifampicin and isoniazid for 6 months

Next question

Tuberculosis: drug therapy

The standard therapy for treating **active tuberculosis** is:

Initial phase - first 2 months (RIPE)

- Rifampicin
- Isoniazid
- Pyrazinamide
- Ethambutol (the 2006 NICE guidelines now recommend giving a 'fourth drug' such as ethambutol routinely - previously this was only added if drug-resistant tuberculosis was suspected)

Continuation phase - next 4 months

- Rifampicin
- Isoniazid

The treatment for **latent tuberculosis** is isoniazid alone for 6 months

Patients with **meningeal tuberculosis** are treated for a prolonged period (at least 12 months) with the addition of steroids

Directly observed therapy with a three times a week dosing regimen may be indicated in certain groups, including:

- homeless people with active tuberculosis
- patients who are likely to have poor concordance
- all prisoners with active or latent tuberculosis



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Next

A 29-year-old man presents with a 12 day history of watery diarrhoea that developed one week after returning from India. He had travelled around northern India for two months. On examination he is afebrile and his abdomen is soft and non-tender. What is the most likely causative organism?



A. Amoebiasis



B. Giardiasis



C. *Campylobacter*



D. *Shigella*



E. *Salmonella*

Next question

The incubation period and prolonged, non-bloody diarrhoea point towards giardiasis

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one or more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools

	Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain
<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



Question 126 of 143

Next

Which one of the following patients does the Department of Health not specifically recommend receives an influenza vaccination?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. A 20-year-old woman who is 20 weeks pregnant with her second child |
| <input type="radio"/> | B. 67-year-old man with a history of ulcerative colitis |
| <input type="radio"/> | C. A 48-year-old obese woman with diet-controlled diabetes mellitus |
| <input type="radio"/> | D. A 60-year-old man with chronic kidney disease stage 3 |
| <input checked="" type="radio"/> | E. 50-year-old with hypothyroidism on thyroxine replacement |

Next question

Please note that pregnancy is a contraindication for the intranasal vaccine normally given to children, not the inactivated, injectable vaccine.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding
- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)

- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days
- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels



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Next

A man presents with severe vomiting. He reports not being able to keep fluids down for the past 12 hours. You suspect a diagnosis of gastroenteritis and on discussing possible causes he mentions reheating curry with rice the night before. What is the most likely causative organism?



A. *Escherichia coli*

- ☐ B. *Campylobacter*
- ☐ C. *Salmonella*
- ☐ D. *Shigella*
-  ☒ E. *Bacillus cereus*

Next question

Bacillus cereus infection most commonly results from reheated rice.

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

Another pattern of illness is 'acute food poisoning'. This describes the sudden onset of nausea, vomiting and diarrhoea after the ingestion of a toxin. Acute food poisoning is typically caused by *Staphylococcus aureus*, *Bacillus cereus* or *Clostridium perfringens*.

Stereotypical histories

Infection	Typical presentation
<i>Escherichia coli</i>	Common amongst travellers Watery stools Abdominal cramps and nausea
Giardiasis	Prolonged, non-bloody diarrhoea
Cholera	Profuse, watery diarrhoea Severe dehydration resulting in weight loss Not common amongst travellers
<i>Shigella</i>	Bloody diarrhoea Vomiting and abdominal pain

<i>Staphylococcus aureus</i>	Severe vomiting Short incubation period
<i>Campylobacter</i>	A flu-like prodrome is usually followed by crampy abdominal pains, fever and diarrhoea which may be bloody Complications include Guillain-Barre syndrome
<i>Bacillus cereus</i>	Two types of illness are seen <ul style="list-style-type: none"> • vomiting within 6 hours, stereotypically due to rice • diarrhoeal illness occurring after 6 hours
Amoebiasis	Gradual onset bloody diarrhoea, abdominal pain and tenderness which may last for several weeks

Incubation period

- 1-6 hrs: *Staphylococcus aureus*, *Bacillus cereus**
- 12-48 hrs: *Salmonella*, *Escherichia coli*
- 48-72 hrs: *Shigella*, *Campylobacter*
- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



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Next

Which one of the following causes of diarrhoea has the shortest incubation period?

- ☐ A. *Salmonella*
- ☐ B. *Shigella*
- ☐ C. *Campylobacter*
- ☐ D. *Escherichia coli*



E. *Bacillus cereus*

[Next question](#)

Gastroenteritis

Gastroenteritis may either occur whilst at home or whilst travelling abroad (travellers' diarrhoea)

Travellers' diarrhoea may be defined as at least 3 loose to watery stools in 24 hours with or without one of more of abdominal cramps, fever, nausea, vomiting or blood in the stool. The most common cause is *Escherichia coli*

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- > 7 days: Giardiasis, Amoebiasis

*vomiting subtype, the diarrhoeal illness has an incubation period of 6-14 hours



Question 129 of 143

Next

You review a phlebotomist who has received a needlestick injury after taking blood from a haemophiliac. What is the latest time that HIV post-exposure prophylaxis may be given?



- ☐ A. 6 hours after the event
- ☐ B. 12 hours after the event
- ☐ C. 24 hours after the event
- ☐ D. 48 hours after the event
- ☒ E. 72 hours after the event



Next question

Post-exposure prophylaxis

Hepatitis A

- Human Normal Immunoglobulin (HNIG) or hepatitis A vaccine may be used depending on the clinical situation

Hepatitis B

- HBsAg positive source: if the person exposed is a known responder to HBV vaccine then a booster dose should be given. If they are in the process of being vaccinated or are a non-responder they need to have hepatitis B immune globulin (HBIG) and the vaccine
- unknown source: for known responders the green book advises considering a booster dose of HBV vaccine. For known non-responders HBIG + vaccine should be given whilst those in the process of being vaccinated should have an accelerated course of HBV vaccine

Hepatitis C

- monthly PCR - if seroconversion then interferon +/- ribavirin

HIV

- a combination of oral antiretrovirals (e.g. Tenofovir, emtricitabine, lopinavir and ritonavir) as soon as possible (i.e. Within 1-2 hours, but may be started up to 72 hours following exposure) for 4 weeks
- serological testing at 12 weeks following completion of post-exposure prophylaxis
- reduces risk of transmission by 80%

Varicella zoster

- VZIG for IgG negative pregnant women/immunosuppressed

Estimates of transmission risk for single needlestick injury

Hepatitis B	20-30%
Hepatitis C	0.5-2%

HIV	0.3%
-----	------



Question 130 of 143

Next

A 17-year-old male student presents with a purulent urethral discharge and tests positive for *Chlamydia*. He has had a number of partners over the past 12 months. Who should be contacted as part of routine contact tracing?



- ☐ A. All partners from the last 6 months or the most recent sexual partner
- ☐ B. All partners from the 3 months prior to the onset of symptoms
- ☐ C. All partners from the last 3 months or the most recent sexual partner
- ☐ D. All partners from the last 12 months or the most recent sexual partner
- ☒ E. All partners from the 4 weeks prior to the onset of symptoms

Next question

Chlamydia - partner notification:

- symptomatic men: all partners from the 4 weeks prior to the onset of symptoms
- women + asymptomatic men: all partners from the last 6 months or the most recent sexual partner

Chlamydia

Chlamydia is the most prevalent sexually transmitted infection in the UK and is caused by *Chlamydia trachomatis*, an obligate intracellular pathogen. Approximately 1 in 10 young women in the UK have *Chlamydia*. The incubation period is around 7-21 days, although it should be

remembered a large percentage of cases are asymptomatic

Features

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

Potential complications

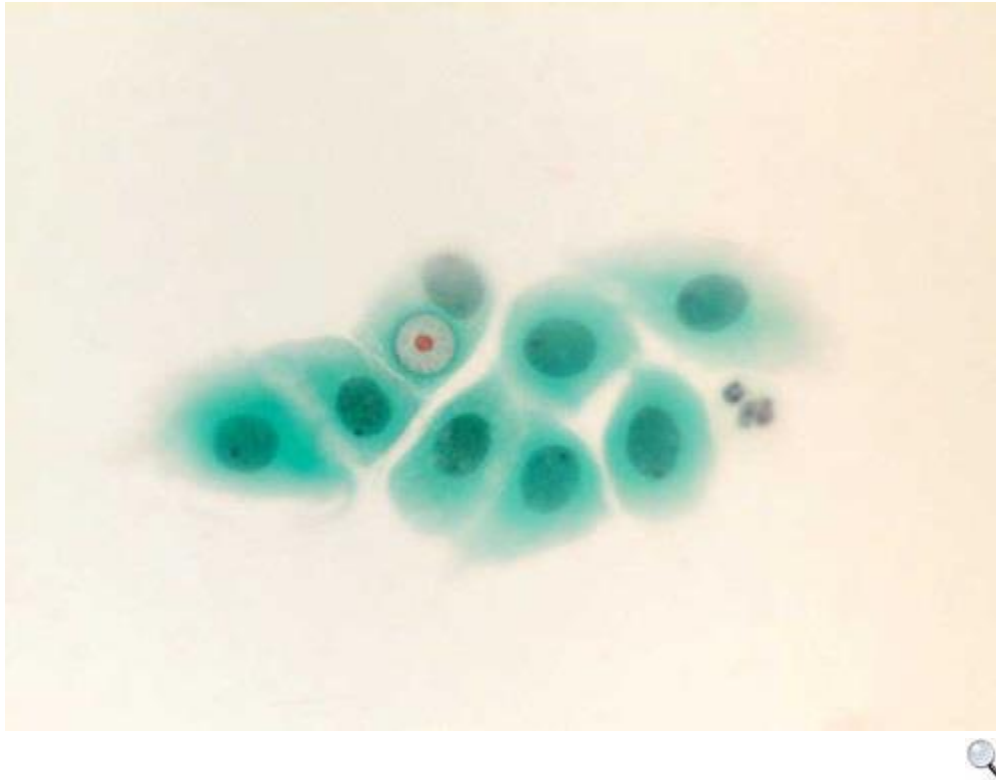
- epididymitis
- pelvic inflammatory disease
- endometritis
- increased incidence of ectopic pregnancies
- infertility
- reactive arthritis
- perihepatitis (Fitz-Hugh-Curtis syndrome)

Investigation

- traditional cell culture is no longer widely used
- nuclear acid amplification tests (NAATs) are now rapidly emerging as the investigation of choice
- urine (first void urine sample), vulvovaginal swab or cervical swab may be tested using the NAAT technique

Screening

- in England the National *Chlamydia* Screening Programme is open to all men and women aged 15-24 years
- the 2009 SIGN guidelines support this approach, suggesting screening all sexually active patients aged 15-24 years
- relies heavily on opportunistic testing



Pap smear demonstrating infected endocervical cells. Red inclusion bodies are typical

Management

- doxycycline (7 day course) or azithromycin (single dose). The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline
- if pregnant then erythromycin or amoxicillin may be used. The SIGN guidelines suggest considering azithromycin 'following discussion of the balance of benefits and risks with the patient'
- patients diagnosed with *Chlamydia* should be offered a choice of provider for initial partner notification - either trained practice nurses with support from GUM, or referral to GUM
- for men with symptomatic infection all partners from the four weeks prior to the onset of symptoms should be contacted
- for women and asymptomatic men all partners from the last six months or the most recent sexual partner should be contacted
- contacts of confirmed *Chlamydia* cases should be offered treatment prior to the results of their investigations being known (treat then test)

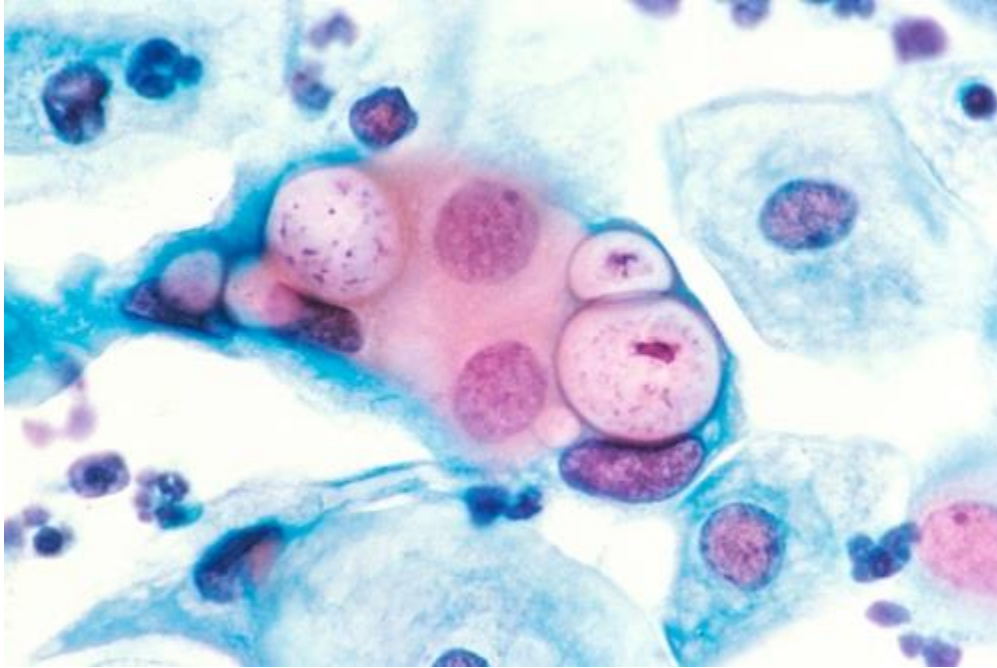


Image sourced from [Wikipedia](#)

Another Pap smear demonstrating infected endocervical cells. Stained with H&E



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Next

A 25-year-old man returns from a gap-year in Central and South America and presents with a 2 month history of an ulcerating lesion on his lower lip. Examination of his nasal and oral mucosae reveals widespread involvement. What is the likely diagnosis?



- | | |
|----------------------------------|----------------------------|
| <input checked="" type="radio"/> | A. Leishmaniasis |
| <input type="radio"/> | B. Chagas disease |
| <input type="radio"/> | C. Cutaneous larva migrans |
| <input type="radio"/> | D. Trypanosomiasis |



E. Cutaneous gonococcal infection

[Next question](#)

This patient most likely has leishmaniasis. The pattern of a primary skin lesion with mucosal involvement is characteristic of *Leishmania brasiliensis*

Leishmaniasis

Leishmaniasis is caused by the intracellular protozoa *Leishmania*, usually being spread by sand flies. Cutaneous, mucocutaneous leishmaniasis and visceral forms are seen

Cutaneous leishmaniasis

- caused by *Leishmania tropica* or *Leishmania mexicana*
- crusted lesion at site of bite
- may be underlying ulcer

Mucocutaneous leishmaniasis

- caused by *Leishmania braziliensis*
- skin lesions may spread to involve mucosae of nose, pharynx etc

Visceral leishmaniasis (kala-azar)

- mostly caused by *Leishmania donovani*
- occurs in the Mediterranean, Asia, South America, Africa
- fever, sweats, rigors
- massive splenomegaly. hepatomegaly
- poor appetite*, weight loss
- grey skin - 'kala-azar' means black sickness
- pancytopenia secondary to hypersplenism

*occasionally patients may report increased appetite with paradoxical weight loss



Question 132 of 143

Next

Which one of the following statements regarding pneumococcal vaccine is true?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Diet-controlled diabetics require the pneumococcal vaccine |
| <input type="radio"/> | B. Infants receive the pneumococcal vaccine at 3 and 12 months |
| <input type="radio"/> | C. Patients who've had a splenectomy require just one dose of pneumococcal vaccine |
| <input type="radio"/> | D. Pneumococcal vaccine should not be given at same time as the seasonal flu vaccine |
| <input checked="" type="radio"/> | E. Adults should receive the pneumococcal polysaccharide vaccine rather than the pneumococcal conjugate vaccine |

Next question

The October 2009 AKT feedback report commented that '**Candidates should consider immunisation more broadly than with regard only to childhood immunisation**'.

Pneumococcal vaccine

There are two type of pneumococcal vaccine currently in use:

- pneumococcal conjugate vaccine (PCV)
- pneumococcal polysaccharide vaccine (PPV)

The PCV is given to children as part of their routine immunisations (at 2, 4 and 13 months).

The PPV is offered to all adults over the age of 65 years, to patients with chronic conditions such as COPD and to those who have had a splenectomy (see below).

Groups who should be vaccinated:

- asplenia or splenic dysfunction
- chronic respiratory disease: COPD, bronchiectasis, cystic fibrosis, interstitial lung disease. Asthma is only included if 'it requires the use of oral steroids at a dose sufficient to act as a significant immunosuppressant'

- chronic heart disease: ischaemic heart disease if requiring medication or follow-up, heart failure, congenital heart disease. Controlled hypertension is not an indication for vaccination
- chronic kidney disease
- chronic liver disease: including cirrhosis and chronic hepatitis
- diabetes mellitus if requiring medication
- immunosuppression (either due to disease or treatment). This includes patients with any stage of HIV infection
- cochlear implants
- patients with cerebrospinal fluid leaks

Adults usually require just one dose but those with asplenia, splenic dysfunction or chronic kidney disease need a booster every 5 years.



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Next

A patient who has recently returned from the Ivory Coast presents with cyclical fever and headache. He is found to have splenomegaly on examination. Following a blood film he is diagnosed as having *Plasmodium vivax* malaria. He is treated initially with chloroquine then later given primaquine. What is the benefit of the primaquine?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Destroy liver hypnozoites and prevent relapse |
| <input type="radio"/> | B. Reduce the risk of chloroquine-related retinopathy |
| <input type="radio"/> | C. Reduce the incidence of chloroquine resistance |
| <input type="radio"/> | D. Cover <i>Plasmodium ovale</i> in case of co-infection |
| <input type="radio"/> | E. Prevent immature trophozoites forming gamatocytes |

Next question

Malaria: non-falciparum

The most common cause of non-falciparum malaria is *Plasmodium vivax*, with *Plasmodium ovale* and *Plasmodium malariae* accounting for the other cases. *Plasmodium vivax* is often found in Central America and the Indian Subcontinent whilst *Plasmodium ovale* typically comes from Africa

Features

- general features of malaria: fever, headache, splenomegaly
- *Plasmodium vivax/ovale*: cyclical fever every 48 hours. *Plasmodium malariae*: cyclical fever every 72 hours
- *Plasmodium malariae*: is associated with nephrotic syndrome

Ovale and vivax malaria have a hypnozoite stage and may therefore relapse following treatment.

Treatment

- non-falciparum malarias are almost always chloroquine sensitive
- patients with ovale or vivax malaria should be given primaquine following acute treatment with chloroquine to destroy liver hypnozoites and prevent relapse



Question 134 of 143

Next

A 28-year-old man presents with painful swellings in his groins. For the past week he has also felt generally unwell with chills and arthralgia. He describes developing a small, painless papule on the prepuce of his penis around 4 weeks ago. This developed into a painless ulcer that later healed without scarring. On examination today nothing abnormal is found on his penis but there are bilateral, tender, enlarged inguinal lymph nodes. He admits to having numerous sexual partners and worries he may have 'caught something'. What is the most appropriate next step?



- | | |
|----------------------------------|-----------------------------------|
| <input checked="" type="radio"/> | A. Oral doxycycline |
| <input type="radio"/> | B. Oral aciclovir |
| <input type="radio"/> | C. Intramuscular benzylpenicillin |
| <input type="radio"/> | D. Do a HIV test |



E. Refer for a biopsy of the lymph nodes

Next question

This patient has second stage Lymphogranuloma Venereum (LGV). As this disease is caused by *Chlamydia* the most appropriate treatment is doxycycline.

STI: ulcers

Genital herpes is most often caused by the herpes simplex virus (HSV) type 2 (cold sores are usually due to HSV type 1). Primary attacks are often severe and associated with fever whilst subsequent attacks are generally less severe and localised to one site

Syphilis is a sexually transmitted infection caused by the spirochaete *Treponema pallidum*. Infection is characterised by primary, secondary and tertiary stages. A painless ulcer (chancre) is seen in the primary stage. The incubation period= 9-90 days

Chancroid is a tropical disease caused by *Haemophilus ducreyi*. It causes painful genital ulcers associated with unilateral, painful inguinal lymph node enlargement. The ulcers typically have a sharply defined, ragged, undermined border.

Lymphogranuloma venereum (LGV) is caused by *Chlamydia trachomatis*. Typically infection comprises of three stages

- stage 1: small painless pustule which later forms an ulcer
- stage 2: painful inguinal lymphadenopathy
- stage 3: proctocolitis

LGV is treated using doxycycline.

Other causes of genital ulcers

- Behcet's disease
- carcinoma
- granuloma inguinale: *Klebsiella granulomatis**

*previously called *Calymmatobacterium granulomatis*



Question 135 of 143

Next

Which one of the following statements regarding hepatitis B and pregnancy is correct?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Without intervention the vertical transmission rate is around 3% |
| <input type="radio"/> | B. Only at risk groups should be screened for hepatitis B during pregnancy |
| <input type="radio"/> | C. Around 30% of mothers with hepatitis B develop pre-eclampsia |
| <input checked="" type="radio"/> | D. It is safe for a mother with hepatitis B to breastfeed her newborn |
| <input type="radio"/> | E. All pregnant women with hepatitis B should take oral ribavirin in the last trimester of pregnancy |

Next question

Without intervention the vertical transmission rate is around 20%, which increases to 90% if the woman is positive for HBeAg.

Hepatitis B and pregnancy

Basics

- all pregnant women are offered screening for hepatitis B
- babies born to mothers who are chronically infected with hepatitis B or to mothers who've had acute hepatitis B during pregnancy should receive a complete course of vaccination + hepatitis B immunoglobulin
- studies are currently evaluating the role of oral antiviral treatment (e.g. Lamivudine) in the latter part of pregnancy
- there is little evidence to suggest caesarean section reduces vertical transmission rates
- hepatitis B cannot be transmitted via breastfeeding (in contrast to HIV)



Question 136 of 143

Next

You receive a prescription request for a 7-year-old girl who has recently emigrated to the UK. She has been diagnosed as having latent tuberculosis and a 6 month course of isoniazid therapy has been recommended. The dose for children aged 1 month - 12 years is 5mg/kg daily (max. 300mg daily). She weighs 27kg. Her father does not feel she would be able to take tablets and a special pharmacy order for isoniazid syrup 50mg/5ml is made. What volume of isoniazid syrup should she be given each day?

Next question

You answered: 7.5 ml 

Correct answer: 13.5 ml

The recommended dose for this child = $5\text{mg/kg} \times 27\text{kg} = 135\text{mg}$

To make the calculation easier we can 'cancel down' the concentration from 50mg/5ml to 10mg/1ml, by dividing both values by 5

The correct volume is therefore $135 / 10 = 13.5 \times 1 = 13.5\text{ml}$

The October 2011 AKT feedback stated: *'We regularly test candidates' ability to calculate drug doses, for example where the drugs need to be given in mg/kg. A worrying number of candidates were apparently unable to correctly perform a relatively simple calculation regarding a drug dose for a child, and this poses concerns about patient safety.'*

Tuberculosis: drug therapy

The standard therapy for treating **active tuberculosis** is:

Initial phase - first 2 months (RIPE)

- Rifampicin
- Isoniazid
- Pyrazinamide
- Ethambutol (the 2006 NICE guidelines now recommend giving a 'fourth drug' such as ethambutol routinely - previously this was only added if drug-resistant tuberculosis was suspected)

Continuation phase - next 4 months

- Rifampicin
- Isoniazid

The treatment for **latent tuberculosis** is isoniazid alone for 6 months

Patients with **meningeal tuberculosis** are treated for a prolonged period (at least 12 months) with the addition of steroids

Directly observed therapy with a three times a week dosing regimen may be indicated in certain groups, including:

- homeless people with active tuberculosis
- patients who are likely to have poor concordance
- all prisoners with active or latent tuberculosis



Question 137 of 143

Next

A phlebotomist gives herself a needlestick injury whilst taking blood from a patient who is known to have the HIV infection. What is the chance that the phlebotomist will develop HIV?

<input type="radio"/>	A. 0.03%
<input checked="" type="radio"/>	B. 0.3%
<input type="radio"/>	C. 1%
<input type="radio"/>	D. 3%
<input type="radio"/>	E. 5-10%

Next question

The transmission rate of HIV is relatively low compared to hepatitis B and C.

Post-exposure prophylaxis

Hepatitis A

- Human Normal Immunoglobulin (HNIG) or hepatitis A vaccine may be used depending on the clinical situation

Hepatitis B

- HBsAg positive source: if the person exposed is a known responder to HBV vaccine then a booster dose should be given. If they are in the process of being vaccinated or are a non-responder they need to have hepatitis B immune globulin (HBIG) and the vaccine
- unknown source: for known responders the green book advises considering a booster dose of HBV vaccine. For known non-responders HBIG + vaccine should be given whilst those in the process of being vaccinated should have an accelerated course of HBV vaccine

Hepatitis C

- monthly PCR - if seroconversion then interferon +/- ribavirin

HIV

- a combination of oral antiretrovirals (e.g. Tenofovir, emtricitabine, lopinavir and ritonavir) as soon as possible (i.e. Within 1-2 hours, but may be started up to 72 hours following exposure) for 4 weeks
- serological testing at 12 weeks following completion of post-exposure prophylaxis
- reduces risk of transmission by 80%

Varicella zoster

- VZIG for IgG negative pregnant women/immunosuppressed

Estimates of transmission risk for single needlestick injury

Hepatitis B	20-30%
Hepatitis C	0.5-2%
HIV	0.3%



Question 138 of 143

Next

A patient is prescribed zanamivir (Relenza) for suspected influenza. Which one of the following underlying problems may increase the likelihood of side-effects?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. A history of aspirin sensitivity |
| <input type="radio"/> | B. Epilepsy |
| <input checked="" type="radio"/> | C. Asthma |
| <input type="radio"/> | D. Renal impairment |
| <input type="radio"/> | E. Concurrent use with drugs that prolong the QT interval |

Next question

Zanamivir (Relenza) may induce bronchospasm in asthmatics.

H1N1 influenza pandemic

The 2009 H1N1 influenza (swine flu) outbreak was first observed in Mexico in early 2009. In June 2009, the WHO declared the outbreak to be a pandemic.

H1N1

The H1N1 virus is a subtype of the influenza A virus and the most common cause of flu in humans. The 2009 pandemic was caused by a new strain of the H1N1 virus.

The following groups are particularly at risk:

- patients with chronic illnesses and those on immunosuppressants
- pregnant women
- young children under 5 years old

Features

The majority of symptoms are typical of those seen in a flu-like illness:

- fever greater than 38°C
- myalgia
- lethargy
- headache
- rhinitis
- sore throat
- cough
- diarrhoea and vomiting

A minority of patients may go on to develop an acute respiratory distress syndrome which may require ventilatory support.

Treatment

There are two main treatments currently available:

Oseltamivir (Tamiflu)

- oral medication
- a neuraminidase inhibitor which prevents new viral particles from being released by infected cells
- common side-effects include nausea, vomiting, diarrhoea and headaches

Zanamivir (Relenza)

- inhaled medication*
- also a neuraminidase inhibitor
- may induce bronchospasm in asthmatics



*intravenous preparations are available for patients who are acutely unwell



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Next

Which one of the following patients should not be offered the herpes zoster vaccine?

	<input type="radio"/>	A. A patient with a history of depression including suicide attempts
	<input type="radio"/>	B. A patient with rheumatoid arthritis taking methotrexate 15mg/week
	<input type="radio"/>	C. A patient who is known to be allergic to egg
	<input checked="" type="radio"/>	D. A patient with temporal arteritis taking prednisolone 50mg/day
	<input type="radio"/>	E. A patient who has previously suffered from shingles

Next question

Regular high-dose prednisolone is an immunosuppressant and hence is a contraindication to Zostavax.

Zostavax should not be given to a person who:

- has primary or acquired immunodeficiency state due to a haematological malignancy, HIV or cellular immune deficiencies
- is receiving immunosuppressive therapy (including high-dose corticosteroids). Zostavax is not contraindicated for use in individuals who are receiving topical/inhaled corticosteroids or low-dose systemic corticosteroids or in patients who are receiving corticosteroids as replacement therapy

Treatment with low-doses of methotrexate (<0.4 mg/Kg/week), azathioprine (<3.0 mg/Kg/day), or 6-mercaptopurine (<1.5 mg/Kg/day) for treatment of rheumatoid arthritis, psoriasis, polymyositis, sarcoidosis, inflammatory bowel disease, and other conditions are not considered sufficiently immunosuppressive and are not contraindications for administration of Zostavax.

Please see the Green Book for more details.

Herpes zoster

Shingles is an acute, unilateral, painful blistering rash caused by reactivation of the Varicella Zoster Virus (VZV).

The 'shingles vaccine'

In 2013 the NHS introduced a vaccine to boost the immunity of elderly people against herpes zoster. Some important points about the vaccine:

- will be offered to patients at the age of **70 years** (a catch-up programme will also be launched initially)
- is **live-attenuated** and given **sub-cutaneously**

As it is a live-attenuated vaccine the main contraindications are immunosuppression.

Side-effects

- injection site reactions
- less than 1 in 10,000 individuals will develop chickenpox

Management of shingles

Oral aciclovir is first-line. One of the main benefits of treatment is a reduction in the incidence of post-herpetic neuralgia.





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Next

A 39-year-old man presents with shortness of breath following one week of flu-like symptoms. He also has a non-productive cough but no chest pain. A chest x-ray shows bilateral consolidation and examination reveals erythematous lesions on his limbs and trunk. Which one of the following investigations is most likely to be diagnostic?



- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Cold agglutins |
| <input type="radio"/> | B. Sputum culture |
| <input type="radio"/> | C. Urinary antigen for Legionella |
| <input checked="" type="radio"/> | D. Serology for Mycoplasma |
| <input type="radio"/> | E. Blood culture |

Next question

Mycoplasma? - serology is diagnostic

The flu-like symptoms, bilateral consolidation and erythema multiforme point to a diagnosis of Mycoplasma. The most appropriate diagnostic test is Mycoplasma serology

Mycoplasma pneumoniae

Mycoplasma pneumoniae is a cause of atypical pneumonia which often affects younger patients. It is associated with a number of characteristic complications such as erythema multiforme and cold autoimmune haemolytic anaemia. Epidemics of *Mycoplasma pneumoniae* classically occur every 4 years. It is important to recognise atypical pneumonias as they may not respond to penicillins or cephalosporins due to it lacking a peptidoglycan cell wall.

Features

- the disease typically has a prolonged and gradual onset
- flu-like symptoms classically precede a dry cough
- bilateral consolidation on x-ray
- complications may occur as below

Complications

- cold agglutins (IgM) may cause an haemolytic anaemia, thrombocytopenia
- erythema multiforme, erythema nodosum
- meningoencephalitis, Guillain-Barre syndrome
- bullous myringitis: painful vesicles on the tympanic membrane
- pericarditis/myocarditis
- gastrointestinal: hepatitis, pancreatitis
- renal: acute glomerulonephritis

Investigations

- diagnosis is generally by Mycoplasma serology
- positive cold agglutination test

Management

- erythromycin/clarithromycin
- tetracyclines such as doxycycline are an alternative



Question 141 of 143

Next

A 65-year-old man who has a long-term catheter is evaluated for possible urosepsis. Which one of the following is part of the diagnostic criteria for systemic inflammatory response syndrome (SIRS)?

<input type="radio"/>	A. 'Body temperature less than 35°C or greater than 39°C'
<input checked="" type="radio"/>	B. 'Systolic blood pressure < 100 mmHg'
<input type="radio"/>	C. 'Respiratory rate greater than 30 breaths per minute'
<input type="radio"/>	D. 'Heart rate greater than 110/min'
<input checked="" type="radio"/>	E. 'Blood glucose > 7.7mmol/L in the absence of known diabetes'

Sepsis: classification

Sepsis is increasingly recognised as important cause of mortality in the UK and there has been increasing efforts recently to improve the care of patients who present with sepsis.

Definitions and diagnosis

Systemic inflammatory response syndrome (SIRS)

- at least 2 of the following
- body temperature less than 36°C or greater than 38.3°C
- heart rate greater than 90/min
- respiratory rate greater than 20 breaths per minute
- blood glucose > 7.7mmol/L in the absence of known diabetes
- white cell count less than 4 or greater than 12

SIRS may occur as a result of an infection (bacterial, viral or fungal) or in response to a non-infective inflammatory cause, for example burns or pancreatitis. Sepsis is defined as SIRS in response to a proven or presumed infection. The mortality rate of sepsis is around 10%.

Recently the Sepsis Trust have introduced the concept of 'red flag' sepsis. They recommend starting the 'sepsis six' if any 1 of the following are present:

Red flag signs:

- systolic blood pressure < 90mmHg or > 40mmHg fall from baseline
- mean arterial pressure < 65mmHg
- heart rate > 131 per minute
- respiratory rate > 25 per minute*
- AVPU = V, P or U*

They also detail a number of laboratory findings which indicate severe sepsis. These are detail at the bottom of the page in the appendix.

Severe sepsis

- sepsis with end organ dysfunction or hypoperfusion (indicated by hypotension, lactic acidosis or decreased urine output or others)

Septic shock

- severe sepsis with persistently low blood pressure which has failed to respond to the administration of intravenous fluids.

Management

Clearly the underlying cause of the patients sepsis needs to be identified and treated and the patient supported regardless of the cause or severity. If however any of the red flags are present the 'sepsis six' should be started straight away:

- 1. Administer high flow oxygen.
- 2. Take blood cultures
- 3. Give broad spectrum antibiotics
- 4. Give intravenous fluid challenges
- 5. Measure serum lactate and haemoglobin
- 6. Measure accurate hourly urine output

Appendix

Laboratory and other findings indicating severe sepsis:

- PaO₂/ FiO₂ ratio < 300 (mmHg) or < 39.9 (kPa)
- Lactate > 2.0mmol/L
- Bilateral pulmonary infiltrates AND new need for supplemental oxygen to maintain oxygen saturations > 90%
- Creatinine > 176.8 μ mol/L
- INR > 1.5
- aPTT > 60s
- Platelet count < 100 x10⁹/L
- Bilirubin > 34.2 μ mol/L
- Urine output < 0.5mL/kg for two consecutive hours



Question 142 of 143

Next

A 19-year-old man presents asking for advice. His girlfriend has recently been diagnosed with meningococcal meningitis. He is worried he may have 'caught it'. What is the recommended antibiotic prophylaxis for close contacts such as this man?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Oral rifampicin |
| <input type="radio"/> | B. Oral phenoxymethylpenicillin |
| <input checked="" type="radio"/> | C. Oral ciprofloxacin |
| <input type="radio"/> | D. Oral erythromycin |
| <input type="radio"/> | E. Intramuscular cefotaxime |

Next question

Ciprofloxacin is now preferred to rifampicin - please see below.

Meningitis: management

Investigations suggested by NICE

- full blood count
- CRP
- coagulation screen
- blood culture
- whole-blood PCR
- blood glucose
- blood gas

Lumbar puncture if no signs of raised intracranial pressure

Management

All patients should be transferred to hospital urgently. If patients are in a pre-hospital setting (for example a GP surgery) and meningococcal disease is suspected then intramuscular benzylpenicillin may be given, as long as this doesn't delay transit to hospital.

BNF recommendations on antibiotics

Scenario	BNF recommendation
Initial empirical therapy aged < 3 months	Intravenous cefotaxime + amoxicillin
Initial empirical therapy aged 3 months - 50 years	Intravenous cefotaxime
Initial empirical therapy aged > 50 years	Intravenous cefotaxime + amoxicillin
Meningococcal meningitis	Intravenous benzylpenicillin or cefotaxime
Pneumococcal meningitis	Intravenous cefotaxime
Meningitis caused by <i>Haemophilus influenzae</i>	Intravenous cefotaxime
Meningitis caused by <i>Listeria</i>	Intravenous amoxicillin + gentamicin

If the patient has a history of immediate hypersensitivity reaction to penicillin or to cephalosporins the BNF recommends using chloramphenicol.

Management of contacts

- prophylaxis needs to be offered to household and close contacts of patients affected with meningococcal meningitis
- oral ciprofloxacin or rifampicin or may be used. The Health Protection Agency (HPA) guidelines now state that whilst either may be used ciprofloxacin is the drug of choice as it is widely available and only requires one dose
- the risk is highest in the first 7 days but persists for at least 4 weeks
- meningococcal vaccination should be offered to close contacts when serotype results are available, including booster doses to those who had the vaccine in infancy
- for pneumococcal meningitis no prophylaxis is generally needed. There are however exceptions to this. If a cluster of cases of pneumococcal meningitis occur the HPA have a protocol for offering close contacts antibiotic prophylaxis. Please see the link for more details



A 54-year-old female is admitted with a severe pneumonia following a holiday in Turkey. Bloods reveal both hyponatraemia and deranged liver function tests. A chest x-ray shows patchy alveolar infiltrates with consolidation in the right lower lobe. Which one of the following investigations is most likely to confirm the probable diagnosis?



<input type="radio"/>	A.	Sputum culture
<input checked="" type="radio"/>	B.	Urinary antigen
<input type="radio"/>	C.	Blood cultures
<input type="radio"/>	D.	Bone marrow aspirate
<input type="radio"/>	E.	Lumbar puncture

Legionella pneumophila is best diagnosed by the **urinary antigen** test

Legionella

Legionnaire's disease is caused by the intracellular bacterium *Legionella pneumophila*. It is typically colonizes water tanks and hence questions may hint at air-conditioning systems or foreign holidays. Person-to-person transmission is not seen

Features

- flu-like symptoms including fever (present in > 95% of patients)
- dry cough
- relative bradycardia
- confusion
- lymphopaenia
- hyponatraemia
- deranged liver function tests
- pleural effusion: seen in around 30% of patients

Diagnosis

- urinary antigen

Management

- treat with erythromycin



Question 1 of 44

Next

A 67-year-old man is discharged after having a percutaneous coronary intervention following an acute coronary syndrome (ACS). He had no past medical of note prior to the ACS. Which type of lipid modification therapy should he have been started on during the admission?



- | | |
|----------------------------------|-------------------------|
| <input type="radio"/> | A. Simvastatin 40mg on |
| <input type="radio"/> | B. Atorvastatin 10mg on |
| <input type="radio"/> | C. Atorvastatin 20mg on |
| <input type="radio"/> | D. Atorvastatin 40mg on |
| <input checked="" type="radio"/> | E. Atorvastatin 80mg on |

Next question

Patients with established CVD should take atorvastatin 80mg on

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics

- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
- → older than 40 years, or
- → have had diabetes for more than 10 years or
- → have established nephropathy or
- → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 2 of 44

Next

You are review a 38-year-old woman with type 1 diabetes mellitus in clinic. Her diabetes is currently controlled with a basal-bolus regime. She takes no other medication apart from citalopram 20mg od for depression. She was diagnosed with type 1 diabetes at the age of 13 years. Her most recent bloods show

Na ⁺	142 mmol/l
K ⁺	3.9 mmol/l
Urea	4.9 mmol/l
Creatinine	79 μ mol/l

Total cholesterol	4.4 mmol/l
HDL cholesterol	1.2 mmol/l
LDL cholesterol	1.8 mmol/l
Triglyceride	1.3 mmol/l

Urine dip: No protein or blood

What is the most appropriate management with regards to lipid modification?



- ☐ A. Start atorvastatin 10mg on
- ☒ B. Start atorvastatin 20mg on
- ☐ C. Start atorvastatin 40mg on
- ☐ D. Perform a QRISK2 assessment
- ☐ E. Reassure her that lipid modification therapy is not required at this stage

Next question

NICE specifically state that we should not use QRISK2 for type 1 diabetics. Instead, the following criteria are used:

- older than 40 years, or
- have had diabetes for more than 10 years or
- have established nephropathy or
- have other CVD risk factors

This patient has had diabetes for 25 years so we should start atorvastatin 20mg on.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

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NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
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- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
- → older than 40 years, or

- → have had diabetes for more than 10 years or
- → have established nephropathy or
- → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible

- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit





Question 3 of 44

Next

A 49-year-old man comes into clinic. One of his friends has recently had a myocardial infarction and he is concerned about his own risk of coronary heart disease. He has no past medical history of note

other than anxiety for which he is not currently taking any medication. He does however smoke around 20 cigarettes a day. Cardiovascular examination is unremarkable. His BMI is 26 kg/m² and blood pressure is 126/82 mmHg.

You strongly advise him to stop smoking. What is the most appropriate further course of action?

- | | | |
|---|----------------------------------|---|
|  | <input type="radio"/> | A. Reassure him that he has a very low risk of coronary heart disease given his age |
| | <input type="radio"/> | B. Arrange a 24 hour blood pressure monitor |
|  | <input checked="" type="radio"/> | C. Arrange a lipid profile then calculate his QRISK2 score |
| | <input type="radio"/> | D. Start orlistat |
| | <input type="radio"/> | E. Refer him for an exercise tolerance test |

Next question

If we feed his age, gender and smoking history into QRISK2 this gives a 10-year-risk of cardiovascular disease (CVD) of 13.9%. He is therefore an appropriate person to have a 'formal' assessment of CVD risk using a lipid profile to further inform the QRISK2 score.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

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- type 1 diabetics
- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria

- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checking to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
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Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

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Alcohol intake

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Smoking cessation

- smokers should be encouraged to quit

Theme: Vitamin deficiency

A.	Vitamin A
B.	Thiamine
C.	Niacin
D.	Pyridoxine
E.	Folic acid
F.	Vitamin B12
G.	Vitamin C
H.	Vitamin D
I.	Vitamin E
J.	Vitamin K

For each one of the following scenarios select the vitamin which may cause these features if deficient:

4. Bleeding gums

✓ Vitamin C

5. Diarrhoea, confusion and eczematous skin

✓ Niacin

This is pellagra

6. Osteomalacia

✓ Vitamin D

Next question

The table below summarises vitamin deficiency states

Vitamin	Chemical name	Deficiency state
A	Retinoids	Night-blindness (nyctalopia)
B1	Thiamine	Beriberi <ul style="list-style-type: none">• polyneuropathy, Wernicke-Korsakoff syndrome• heart failure
B3	Niacin	Pellagra <ul style="list-style-type: none">• dermatitis• diarrhoea• dementia
B6	Pyridoxine	Anaemia, irritability, seizures
B7	Biotin	Dermatitis, seborrhoea
B9	Folic acid	Megaloblastic anaemia, deficiency during pregnancy - neural tube defects
B12	Cyanocobalamin	Megaloblastic anaemia, peripheral neuropathy
C	Ascorbic acid	Scurvy <ul style="list-style-type: none">• gingivitis• bleeding
D	Ergocalciferol, cholecalciferol	Rickets, osteomalacia
E	Tocopherol, tocotrienol	Mild haemolytic anaemia in newborn infants, ataxia, peripheral neuropathy
K	Naphthoquinone	Haemorrhagic disease of the newborn, bleeding diathesis



Question 7 of 44

Next

A 60-year-old man is found to have a QRISK2 score of 14% after having his cholesterol levels checked. After discussing the pros and cons he elects to start atorvastatin 20mg on.

Total cholesterol	5.6 mmol/l
HDL cholesterol	1.0 mmol/l
LDL cholesterol	3.4 mmol/l
Triglyceride	1.7 mmol/l

At what point should he have a repeat cholesterol test done to test the effectiveness of the statin?



- ☐ A. 6 weeks
- ☒ B. 12 weeks
- ☐ C. 6 months
- ☐ D. 12 months
- ☐ E. Checking cholesterol levels is not needed in primary prevention

Next question

A lipid profile and liver function tests should be performed 3 months after starting a statin

NICE recommend the following:

Measure total cholesterol, HDL cholesterol and non-HDL cholesterol in all people who have been started on high-intensity statin treatment at 3 months of treatment and aim for a greater than 40% reduction in non-HDL cholesterol.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the

age of 60 years. Anyway, the key points of the new guidelines are summarised below.

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Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a

first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
 - → have established nephropathy or
 - → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 8 of 44

Next

You are reviewing a patient's blood results:

K ⁺	6.2 mmol/l
----------------	------------

Which one of the following medications is most likely to be responsible for this result?



- | | |
|----------------------------------|------------------------|
| <input type="radio"/> | A. Sodium bicarbonate |
| <input type="radio"/> | B. Bendroflumethiazide |
| <input type="radio"/> | C. Frusemide |
| <input checked="" type="radio"/> | D. Spironolactone |
| <input type="radio"/> | E. St John's Wort |



Next question

Hyperkalaemia

Plasma potassium levels are regulated by a number of factors including aldosterone, acid-base balance and insulin levels. Metabolic acidosis is associated with hyperkalaemia as hydrogen and potassium ions compete with each other for exchange with sodium ions across cell membranes and in the distal tubule. ECG changes seen in hyperkalaemia include tall-tented T waves, small P waves, widened QRS leading to a sinusoidal pattern and asystole

Causes of hyperkalaemia:

- acute renal failure
- drugs*: potassium sparing diuretics, ACE inhibitors, angiotensin 2 receptor blockers, spironolactone, ciclosporin, heparin**
- metabolic acidosis
- Addison's
- rhabdomyolysis
- massive blood transfusion

Foods that are high in potassium:

- salt substitutes (i.e. Contain potassium rather than sodium)
- bananas, oranges, kiwi fruit, avocado, spinach, tomatoes

*beta-blockers interfere with potassium transport into cells and can potentially cause hyperkalaemia in renal failure patients - remember beta-agonists, e.g. Salbutamol, are sometimes used as emergency treatment

**both unfractionated and low-molecular weight heparin can cause hyperkalaemia. This is thought to be caused by inhibition of aldosterone secretion



Question 9 of 44

Next

A 35-year-old woman presents concerned about her weight. Her body mass index is 34 kg/m². Which one of the following best describes her weight?

- ✓ ☒ A. Obese (Obese I)
- ✗ ☐ B. Morbidly obese (Obese III)
- ☐ C. Overweight
- ☐ D. Clinically obese (Obese II)
- ☐ E. Normal

[Next question](#)

Body mass index

Body mass index (BMI) is calculated by dividing the weight (in kilograms) by the height (in metres) squared

BMI	Old classification	NICE classification
< 18.5	Underweight	Underweight
18.5 - 24.9	Normal	Normal
25 - 29.9	Overweight	Overweight
30 - 34.9	Obese	Obese I
35 - 39.9	Clinically obese	Obese II
> 40	Morbidly obese	Obese III



Which one of the following statements regarding NICE guidance on the primary prevention of cardiovascular disease (CVD) is correct



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Premature coronary heart disease is defined as < 75 years in females |
| <input type="radio"/> | B. A 10-year risk of 20% is used to identify patients who should be considered for lipid-lowering therapy |
| <input type="radio"/> | C. Atorvastatin 40mg on is the first line treatment in patients with a significant risk |
| <input checked="" type="radio"/> | D. QRISK2 should be used in preference to the Joint British Society 2 (JBS2) risk tool |
| <input type="radio"/> | E. QRISK2 can be used for a patient who is 88-years-old |

Next question

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics
- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

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- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

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Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
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- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

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- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 11 of 44

Next

A 43-year-old man requests a 'medical' as he is concerned about his risk of heart disease. His father died at the age of 45-years following a myocardial infarction. His lipid profile is as follows:

HDL	1.4 mmol/l
LDL	5.7 mmol/l
Triglycerides	2.3 mmol/l
Total cholesterol	8.2 mmol/l

Clinical examination reveals tendon xanthomata around his ankles. What is the most likely diagnosis?



- ☐ A. Mixed hyperlipidaemia
- ☐ B. Nephrotic syndrome
- ☐ C. Alcohol excess
- ☐ D. Non-familial hypercholesterolaemia
- ☒ E. Familial hypercholesterolaemia

Next question

The presence of tendon xanthomata and cholesterol levels meet the diagnostic criteria for familial hypercholesterolaemia

Familial hypercholesterolaemia

Familial hypercholesterolaemia (FH) is an autosomal dominant condition that is thought to affect around 1 in 500 people. It results in high levels of LDL-cholesterol which, if untreated, may cause early cardiovascular disease (CVD). FH is caused by mutations in the gene which encodes the LDL-receptor protein.

Clinical diagnosis is now based on the **Simon Broome criteria**:

- in adults total cholesterol (TC) > 7.5 mmol/l and LDL-C > 4.9 mmol/l or children TC > 6.7 mmol/l and LDL-C > 4.0 mmol/l, plus:

- for definite FH: tendon xanthoma in patients or 1st or 2nd degree relatives or DNA-based evidence of FH
- for possible FH: family history of myocardial infarction below age 50 years in 2nd degree relative, below age 60 in 1st degree relative, or a family history of raised cholesterol levels

Management

- the use of CVD risk estimation using standard tables is not appropriate in FH as they do not accurately reflect the risk of CVD
- referral to a specialist lipid clinic is usually required
- the maximum dose of potent statins are usually required
- first-degree relatives have a 50% chance of having the disorder and should therefore be offered screening. This includes children who should be screened by the age of 10 years if there is one affected parent
- statins should be discontinued in women 3 months before conception due to the risk of congenital defects



Question 12 of 44

Next

A 67-year-old woman presents with lethargy, depression and constipation. A set of screening blood tests reveals the following:

Calcium	3.05 mmol/l
Albumin	41 g/l

What is the single most useful test for determining the cause of her hypercalcaemia?



- ☐ A. ESR
- ☐ B. Phosphate
- ☐ C. Vitamin D level
- ☒ D. Parathyroid hormone



E. ACE level

Next question

Parathyroid hormone levels are useful as malignancy and primary hyperparathyroidism are the two most common causes of hypercalcaemia. A parathyroid hormone that is normal or raised suggests primary hyperparathyroidism.

Hypercalcaemia: causes

The most common causes of hypercalcaemia are malignancy (bone metastases, myeloma, PTHrP from squamous cell lung cancer) and primary hyperparathyroidism

Other causes include

- sarcoidosis*
- vitamin D intoxication
- acromegaly
- thyrotoxicosis
- Milk-alkali syndrome
- drugs: thiazides, calcium containing antacids
- dehydration
- Addison's disease
- Paget's disease of the bone**

*other causes of granulomas may lead to hypercalcaemia e.g. Tuberculosis and histoplasmosis

**usually normal in this condition but hypercalcaemia may occur with prolonged immobilisation



Question 13 of 44

Next

Which one of the following patients is most likely to have their true risk of cardiovascular disease underestimated by QRISK2?



A. A 54-year-old man with a history of schizophrenia who takes olanzapine



B. A 59-year-old man with a 14 year history of type 2 diabetes mellitus

<input type="radio"/>	C. A 62-year-old man with body mass index of 34.1 kg/m ²
<input type="radio"/>	D. A 50-year-old man who drinks around 30-40 units of alcohol/week
<input type="radio"/>	E. A 67-year-old woman with a history of chronic obstructive pulmonary disease

Next question

QRISK2 may underestimate the risk of cardiovascular disease in patients with a serious mental health disorder and those taking antipsychotics.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

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Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

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Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
 - → have established nephropathy or
 - → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
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Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
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Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 14 of 44

Next

A 60-year-old man who is known to have lung cancer comes for review. For the past three weeks he has lost his appetite, has been feeling sick and generally feels tired. On examination he appears to be mildly dehydrated. You order some blood tests:

Calcium	3.12 mmol/l
Albumin	40 g/l
Glucose (random)	6.7 mmol/l

Urea	10.2 mmol/l
Creatinine	115 µmol/l

Which one of his existing medications is most likely to be contributing to his presentation?

- ☐ A. Amlodipine
-  ☐ B. Simvastatin
-  ☒ C. Bendroflumethiazide
- ☐ D. Aspirin
- ☐ E. Lisinopril

Next question

Thiazides cause hypercalcaemia

Hypercalcaemia: causes

The most common causes of hypercalcaemia are malignancy (bone metastases, myeloma, PTHrP from squamous cell lung cancer) and primary hyperparathyroidism

Other causes include

- sarcoidosis*
- vitamin D intoxication
- acromegaly
- thyrotoxicosis
- Milk-alkali syndrome
- drugs: thiazides, calcium containing antacids
- dehydration
- Addison's disease
- Paget's disease of the bone**

*other causes of granulomas may lead to hypercalcaemia e.g. Tuberculosis and histoplasmosis

**usually normal in this condition but hypercalcaemia may occur with prolonged immobilisation



Question 15 of 44

Next

A 65-year-old Asian female presents to her GP with generalised bone pain and muscle weakness. Investigations show:

Calcium	2.07 mmol/l
Phosphate	0.66 mmol/l
ALP	256 U/l

What is the most likely diagnosis?



- ☐ A. Bone tuberculosis
- ☐ B. Hypoparathyroidism
- ☐ C. Myeloma
- ☒ D. Osteomalacia
- ☐ E. Paget's disease

Next question

The low calcium and phosphate combined with the raised alkaline phosphatase point towards osteomalacia

Osteomalacia

Basics

- normal bony tissue but decreased mineral content
- rickets if when growing
- osteomalacia if after epiphysis fusion

Types

- vitamin D deficiency e.g. malabsorption, lack of sunlight, diet
- renal failure
- drug induced e.g. anticonvulsants
- vitamin D resistant; inherited
- liver disease, e.g. cirrhosis

Features

- rickets: knock-knee, bow leg, features of hypocalcaemia
- osteomalacia: bone pain, fractures, muscle tenderness, proximal myopathy

Investigation

- low calcium, phosphate, 25(OH) vitamin D
- raised alkaline phosphatase
- x-ray: children - cupped, ragged metaphyseal surfaces; adults - translucent bands (Looser's zones or pseudofractures)

Treatment

- calcium with vitamin D tablets



Question 16 of 44

Next

A 46-year-old man with a history of hyperlipidaemia is reviewed in clinic. He is currently taking simvastatin 10mg on but his cholesterol level remains high. Previous attempts to increase the dose of simvastatin have resulted in myalgia. Given the history of myalgia, which lipid-regulating drug should be avoided?



A. Nicotinic acid



- ☒ **B. Bezafibrate**
- ☐ C. Colestyramine
- ☐ D. Omega-3 fatty acid
- ☐ E. Ezetimibe

[Next question](#)

Tough question as both fibrates and nicotinic acid have been associated with myositis, especially when combined with a statin. However, the Committee on Safety of Medicines has produced guidance which specifically warns about the concomitant prescription of fibrates with statins in relation to muscle toxicity

Hyperlipidaemia: mechanism of action and adverse effects

The following table compares the side-effects of drugs used in hyperlipidaemia:

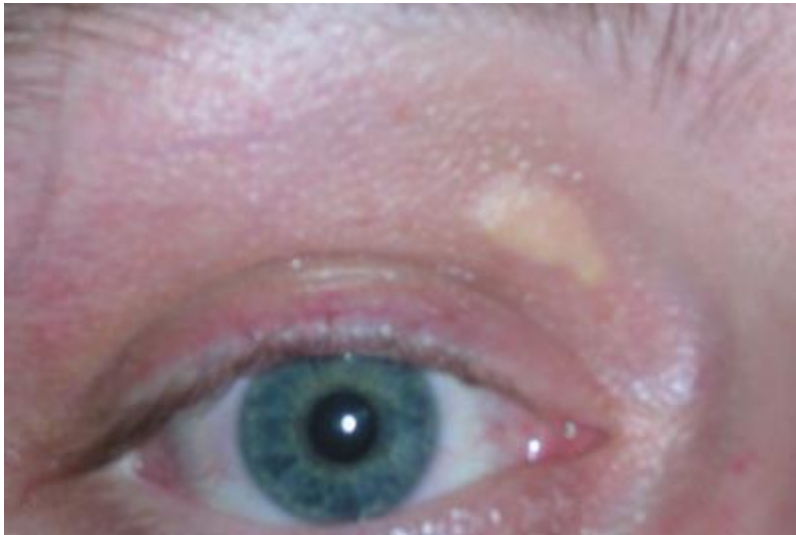
Drugs	Mechanism of action	Adverse effects
Statins	HMG CoA reductase inhibitors	Myositis, deranged LFTs
Ezetimibe	Decreases cholesterol absorption in the small intestine	Headache
Nicotinic acid	Decreases hepatic VLDL secretion	Flushing, myositis
Fibrates	Agonist of PPAR-alpha therefore increases lipoprotein lipase expression	Myositis, pruritus, cholestasis
Cholestyramine	Decreases bile acid reabsorption in the small intestine, upregulating the amount of cholesterol that is converted to bile acid	GI side-effects



Question 17 of 44

[Next](#)

A 40-year-old man presents to surgery as he has noted an abnormality around his right eye:



What is the most likely diagnosis?

- | | |
|----------------------------------|--------------------------|
| <input type="radio"/> | A. Hypertriglyceridaemia |
| <input checked="" type="radio"/> | B. Hypercholesterolaemia |
| <input type="radio"/> | C. Hypothyroidism |
| <input type="radio"/> | D. Wilson's disease |
| <input type="radio"/> | E. Diabetes mellitus |

Next question

This patient has developed xanthelasma secondary to hypercholesterolaemia.

Hyperlipidaemia: xanthomata

Characteristic xanthomata seen in hyperlipidaemia:

Palmar xanthoma

- remnant hyperlipidaemia
- may less commonly be seen in familial hypercholesterolaemia

Eruptive xanthoma are due to high triglyceride levels and present as multiple red/yellow vesicles on the extensor surfaces (e.g. elbows, knees)

Causes of eruptive xanthoma

- familial hypertriglyceridaemia
- lipoprotein lipase deficiency

Tendon xanthoma, tuberous xanthoma, xanthelasma

- familial hypercholesterolaemia
- remnant hyperlipidaemia

Xanthelasma are also seen without lipid abnormalities

Management of xanthelasma, options include:

- surgical excision
- topical trichloroacetic acid
- laser therapy
- electrodesiccation



Question 18 of 44



Next

A 69-year-old man who had a stroke 3 years ago is reviewed. After his diagnosis he was started on simvastatin 40mg on for secondary prevention of further cardiovascular disease. A fasting lipid profile taken one week ago is reported as follows:

Total cholesterol	5.4 mmol/l
HDL cholesterol	1.0 mmol/l
LDL cholesterol	4.1 mmol/l

Triglyceride	1.5 mmol/l
--------------	------------

According to recent NICE guidelines, what is the most appropriate action?

- ☐ A. Switch to simvastatin 80mg on
-  ☐ B. No change in medication, repeat lipid profile in 6 months
- ☐ C. Add nicotinic acid
-  ☒ D. Switch to atorvastatin 80mg on
- ☐ E. Add ezetimibe

Next question

NICE guidelines changed in 2014 on the use of statins in both primary and secondary prevention. Atorvastatin 80mg is now the treatment of choice for patients with established cardiovascular disease. As the LDL cholesterol remains elevated it is appropriate to switch this patient.

Hyperlipidaemia: management

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- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 19 of 44

Next

A 68-year-old Asian woman comes for advice. She is concerned about vitamin D deficiency after reading an article in the newspaper. She is generally fit and well and specifically does not have any muscle/bone pain or weakness. Her only past medical history of note is hypertension and spinal stenosis. She does not cover her head for cultural reasons. What is the most appropriate advice to give?



A. Without any symptoms of osteomalacia no further action is required



B. She should take vitamin D 10mcg od



C. She should complete a food diary and come back in 2 weeks time for review



D. A vitamin D test should be done



E. A DEXA scan should be arranged

Next question

People who are at higher risk of vitamin D deficiency (in this scenario age > 65 years, pigmented skin) should be treated anyway so testing is not necessary.

Vitamin D supplementation

Vitamin D supplementation has been a hot topic for a number of years now. The muddled waters are now slightly clearer following the release of the following:

- 2012: letter by the Chief Medical Officer regarding vitamin D supplementation
- 2013: National Osteoporosis Society (NOS) release UK Vitamin D guideline

The following groups should be advised to take vitamin D supplementation:

- all pregnant and breastfeeding women should take a daily supplement containing 10µg of vitamin D
- all children aged 6 months - 5 years. Babies fed with formula milk do not need to take a supplement if they are taking more than 500ml of milk a day, as formula milk is fortified with vitamin D
- adults > 65 years

- 'people who are not exposed to much sun should also take a daily supplement'

Testing for vitamin D deficiency

The key message is that not many people warrant a vitamin D test. The NOS guidelines specify that testing may be appropriate in the following situations:

- patients with bone diseases that may be improved with vitamin D treatment e.g. known osteomalacia or Paget's disease
- patients with bone diseases, prior to specific treatment where correcting vitamin deficiency is appropriate e.g, prior to intravenous zoledronate or denosumab
- patients with musculoskeletal symptoms that could be attributed to vitamin D deficiency e.g. bone pain ?osteomalacia

Patients with osteoporosis should always be given calcium/vitamin D supplements to testing is not considered necessary. People who are at higher risk of vitamin D deficiency (see above) should be treated anyway so again testing is not necessary.



Question 20 of 44

Next

Your next patient is an 18-year-old man who has Down's syndrome. He had acute lymphoblastic leukaemia as a child but made a full recovery. He is also slightly overweight with a BMI of 28 kg/m². Which one of the following best describes the monitoring he should have?

<input type="radio"/>	A. Cholesterol every 12 months
<input type="radio"/>	B. HbA1c every 2 years
<input checked="" type="radio"/>	C. HbA1c every 12 months
<input type="radio"/>	D. TSH every 2 years
<input checked="" type="radio"/>	E. TSH every 12 months

Next question

Specific QOF markers

It is unlikely that the examiners would expect you to have a detailed knowledge of the Quality and Outcomes Framework (QOF) for the exam, particularly as the markers can change on a regular basis. They may however provide a useful 'summary of evidence' of targets and how often certain things should be done.

Remember that QOF often describes a minimum standard of care and more specific guidelines (e.g. NICE) should be followed when determining the best course of action, whether in clinical practice or in the exam.

The table below therefore gives a very limited summary of such points:

Condition	Recommendation
Coronary heart disease, cerebrovascular disease, peripheral arterial disease, diabetes mellitus	Target cholesterol < 5 mmol/l
Down's syndrome	TSH measured every 12 months
Schizophrenia, bipolar affective disorder	The following should be recorded every 12 months: <ul style="list-style-type: none">• blood pressure• total cholesterol:HDL ratio, HbA1c• body mass index



Question 21 of 44

Next

A 45-year-old man with a persistent chest infection presents to surgery for review. He has now had two courses of antibiotics with no real improvement. A decision is made to perform a chest x-ray and do screening blood tests. When interpreting the blood tests which one of the following would not normally be raised in response to an acute infection?



☐ A. CRP

<input type="radio"/>	B. Platelets
<input type="radio"/>	C. ESR
<input checked="" type="radio"/>	D. Albumin
<input type="radio"/>	E. Ferritin

Next question

Albumin levels are often reduced following an acute phase response

Acute phase proteins

Acute phase proteins

- CRP
- procalcitonin
- ferritin
- fibrinogen
- alpha-1 antitrypsin
- caeruloplasmin
- serum amyloid A
- serum amyloid P component*
- haptoglobin
- complement

During the acute phase response the liver decreases the production of other proteins (sometimes referred to as negative acute phase proteins). Examples include:

- albumin
- transthyretin (formerly known as prealbumin)
- transferrin
- retinol binding protein
- cortisol binding protein

*plays a more significant role in other mammals such as mice



Question 22 of 44

Next

You are reviewing the blood results for a patient who was started on atorvastatin 20mg on for primary prevention 3 months ago:

	Recent	3 months ago prior to starting treatment
Total cholesterol	4.2 mmol/l	6.3 mmol/l
HDL cholesterol	1.1 mmol/l	1.0 mmol/l
Non-HDL cholesterol	2.1 mmol/l	4.0 mmol/l
Triglyceride	1.2 mmol/l	1.3 mmol/l

Liver function tests are normal.

What is the most appropriate course of action?



A. Reduce atorvastatin to 10mg on



B. Make no changes to medication



C. Increase atorvastatin to 40mg on



D. Check creatine kinase



E. Check compliance

Next question

NICE look for a 40% reduction in non-HDL cholesterol after 3 months. A 10% reduction in a non-HDL cholesterol of 4.0 would be 0.4 so a 40% reduction would take it down to $(4.0 - 1.6 = 2.4)$ mmol/l. This patients non-HDL cholesterol of 2.1 mmol/l is therefore acceptable.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at

high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics
- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD

risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
 - → have established nephropathy or
 - → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 23 of 44

Next

Which one of the following medications used in the management of hyperlipidaemia is most likely to cause flushing?

<input type="radio"/>	A. Bezafibrate
<input checked="" type="radio"/>	B. Ezetimibe
<input checked="" type="radio"/>	C. Nicotinic acid
<input type="radio"/>	D. Atorvastatin
<input type="radio"/>	E. Cholestyramine

Next question

Hyperlipidaemia: mechanism of action and adverse effects

The following table compares the side-effects of drugs used in hyperlipidaemia:

Drugs	Mechanism of action	Adverse effects
Statins	HMG CoA reductase inhibitors	Myositis, deranged LFTs
Ezetimibe	Decreases cholesterol absorption in the small intestine	Headache

Nicotinic acid	Decreases hepatic VLDL secretion	Flushing, myositis
Fibrates	Agonist of PPAR-alpha therefore increases lipoprotein lipase expression	Myositis, pruritus, cholestasis
Cholestyramine	Decreases bile acid reabsorption in the small intestine, upregulating the amount of cholesterol that is converted to bile acid	GI side-effects



Question 24 of 44

Next

A 42-year-old man is reviewed in clinic after recently having some bloods taken. He requested screening for 'heart disease' as his father died of a myocardial infarction aged 52-years. Today his blood pressure is 130/84 mmHg and body mass index is 26 kg/m². He is a non-smoker.

His recent bloods showed the following

Na ⁺	142 mmol/l
K ⁺	3.6 mmol/l
Urea	5.5 mmol/l
Creatinine	80 µmol/l

Total cholesterol	7.9 mmol/l
HDL cholesterol	1.4 mmol/l
LDL cholesterol	5.5 mmol/l
Triglyceride	1.4 mmol/l
Fasting glucose	5.2 mmol/l

You calculate his QRISK2 as 4.2%. What is the most appropriate course of action?



- ☒ A. Start atorvastatin 40mg on
- ☐ B. Start atorvastatin 80mg on
- ☒ C. Refer him to a specialist lipids clinic
- ☐ D. Reassure him that his risk of cardiovascular disease is low



E. Start atorvastatin 20mg on

Next question

In the 2014 NICE lipid modification guidelines a number of recommendations were made regarding familial hyperlipidaemia. NICE recommends the following:

Consider the possibility of familial hypercholesterolaemia and investigate as described in Familial hypercholesterolaemia (NICE clinical guideline 71) if they have:

- *a total cholesterol concentration more than 7.5 mmol/litre and*
- *a family history of premature coronary heart disease.*

Arrange for specialist assessment of people with a total cholesterol concentration of more than 9.0 mmol/litre or a nonHDL cholesterol concentration of more than 7.5 mmol/litre even in the absence of a firstdegree family history of premature coronary heart disease.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

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NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
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Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
 - → have established nephropathy or
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Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
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Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

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- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
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- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
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Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 25 of 44

Next

Which one of the following patients should have their vitamin D status checked?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. A patient with newly diagnosed osteoporosis who is about to start oral alendronate |
| <input type="radio"/> | B. A patient who has been found to be hypercalcaemic |
| <input type="radio"/> | C. An immigrant from South-East Asia who is 70-years-old |
| <input checked="" type="radio"/> | D. A patient with newly diagnosed Paget's disease |
| <input type="radio"/> | E. A woman who 10-weeks pregnant |



Next question

Vitamin D supplementation

Vitamin D supplementation has been a hot topic for a number of years now. The muddled waters are now slightly clearer following the release of the following:

- 2012: letter by the Chief Medical Officer regarding vitamin D supplementation
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The following groups should be advised to take vitamin D supplementation:

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- adults > 65 years
- 'people who are not exposed to much sun should also take a daily supplement'

Testing for vitamin D deficiency

The key message is that not many people warrant a vitamin D test. The NOS guidelines specify that testing may be appropriate in the following situations:

- patients with bone diseases that may be improved with vitamin D treatment e.g. known osteomalacia or Paget's disease
- patients with bone diseases, prior to specific treatment where correcting vitamin deficiency is appropriate e.g, prior to intravenous zoledronate or denosumab
- patients with musculoskeletal symptoms that could be attributed to vitamin D deficiency e.g. bone pain ?osteomalacia

Patients with osteoporosis should always be given calcium/vitamin D supplements to testing is not considered necessary. People who are at higher risk of vitamin D deficiency (see above) should be treated anyway so again testing is not necessary.



Question 26 of 44

Next

A 54-year-old man is reviewed in clinic. He has recently started atorvastatin 20mg after it was found that his QRISK2 score was 16%. He asks you about any changes he should make to his diet. Which one of the following is a part of NICE's current advice on a cardioprotective diet?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Eat at least 7 portions of fruit and vegetables a day |
| <input type="radio"/> | B. Increase the amount of fructose in diet |
| <input checked="" type="radio"/> | C. Eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week |
| <input type="radio"/> | D. Saturated fats should be between 7-10% of total energy intake |
| <input type="radio"/> | E. Monounsaturated spreads are preferred to those derived from olive oil |

Next question

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

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Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
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Lifestyle modifications

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- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
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- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity

- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 27 of 44

Next

How common is the heterozygous form of familial hypercholesterolaemia?

- | | |
|----------------------------------|--------------------|
| <input type="radio"/> | A. 1 in 20 people |
| <input checked="" type="radio"/> | B. 1 in 50 people |
| <input type="radio"/> | C. 1 in 100 people |
| <input type="radio"/> | D. 1 in 200 people |
| <input checked="" type="radio"/> | E. 1 in 500 people |

Next question

Familial hypercholesterolaemia

Familial hypercholesterolaemia (FH) is an autosomal dominant condition that is thought to affect around 1 in 500 people. It results in high levels of LDL-cholesterol which, if untreated, may cause early cardiovascular disease (CVD). FH is caused by mutations in the gene which encodes the LDL-receptor protein.

Clinical diagnosis is now based on the **Simon Broome criteria**:

- in adults total cholesterol (TC) > 7.5 mmol/l and LDL-C > 4.9 mmol/l or children TC > 6.7 mmol/l and LDL-C > 4.0 mmol/l, plus:
- for definite FH: tendon xanthoma in patients or 1st or 2nd degree relatives or DNA-based evidence of FH
- for possible FH: family history of myocardial infarction below age 50 years in 2nd degree relative, below age 60 in 1st degree relative, or a family history of raised cholesterol levels

Management

- the use of CVD risk estimation using standard tables is not appropriate in FH as they do not accurately reflect the risk of CVD
- referral to a specialist lipid clinic is usually required
- the maximum dose of potent statins are usually required
- first-degree relatives have a 50% chance of having the disorder and should therefore be offered screening. This includes children who should be screened by the age of 10 years if there is one affected parent
- statins should be discontinued in women 3 months before conception due to the risk of congenital defects





Question 28 of 44

Next

A 69-year-old female with a history of multiple myeloma presents with confusion. Blood tests are taken and the following results are obtained:

Adjusted calcium	3.1 mmol/l
------------------	------------

What is the most appropriate initial management?

-  ☐ A. Oral alendronate + prednisolone
- ☐ B. Oral alendronate
- ☐ C. Oral prednisolone
- ☐ D. Admit for IV pamidronate
-  ☒ E. Admit for IV normal saline

Next question

Hypercalcaemia: management

The initial management of hypercalcaemia is rehydration with normal saline, typically 3-4 litres/day. Following rehydration bisphosphonates may be used. They typically take 2-3 days to work with maximal effect being seen at 7 days

Other options include:

- calcitonin - quicker effect than bisphosphonates
- steroids in sarcoidosis

There is a limited role for the use of furosemide in hypercalcaemia. It may be useful in patients who cannot tolerate aggressive fluid rehydration



Question 29 of 44

Next

A 17-year-old girl presents to her GP with a 6 week history of nausea and abdominal discomfort. Routine blood tests reveal the following.

Hb	11.9 g/dl
----	-----------

WBC	6.7 *10 ⁹ /l
Platelets	346 *10 ⁹ /l
Calcium	2.43 mmol/l
Bilirubin	7 μ mol/l
ALP	262 u/l
ALT	35 u/l

What is the most likely diagnosis?

-  ☐ A. Alcoholic liver disease
- ☐ B. Cholangiocarcinoma
-  ☒ C. Pregnancy
- ☐ D. Gallstones
- ☐ E. Primary biliary cirrhosis

Next question

Alkaline phosphatase is significantly elevated in pregnancy

Alkaline phosphatase

Causes of raised alkaline phosphatase (ALP)

- liver: cholestasis, hepatitis, fatty liver, neoplasia
- Paget's
- osteomalacia
- bone metastases
- hyperparathyroidism
- renal failure
- physiological: pregnancy, growing children, healing fractures

The table below splits the causes according to the calcium level

Raised ALP and raised calcium	Raised ALP and low calcium
<ul style="list-style-type: none"> ❖ Bone metastases ❖ Hyperparathyroidism 	<ul style="list-style-type: none"> ❖ Osteomalacia ❖ Renal failure



Question 30 of 44

Next

You are advising a patient who has recently been diagnosed with chronic kidney disease stage 4 with regards to her diet. Which one of the following foods should she eat in moderation due to the high potassium content?



- ☒ A. Tomatoes
- ☐ B. Plums
- ☐ C. Cranberry juice
- ☐ D. Grapes
- ☐ E. Green beans

Next question

Hyperkalaemia

Plasma potassium levels are regulated by a number of factors including aldosterone, acid-base balance and insulin levels. Metabolic acidosis is associated with hyperkalaemia as hydrogen and potassium ions compete with each other for exchange with sodium ions across cell membranes and in the distal tubule. ECG changes seen in hyperkalaemia include tall-tented T waves, small P waves, widened QRS leading to a sinusoidal pattern and asystole

Causes of hyperkalaemia:

- acute renal failure

- drugs*: potassium sparing diuretics, ACE inhibitors, angiotensin 2 receptor blockers, spironolactone, ciclosporin, heparin**
- metabolic acidosis
- Addison's
- rhabdomyolysis
- massive blood transfusion

Foods that are high in potassium:

- salt substitutes (i.e. Contain potassium rather than sodium)
- bananas, oranges, kiwi fruit, avocado, spinach, tomatoes

*beta-blockers interfere with potassium transport into cells and can potentially cause hyperkalaemia in renal failure patients - remember beta-agonists, e.g. Salbutamol, are sometimes used as emergency treatment

**both unfractionated and low-molecular weight heparin can cause hyperkalaemia. This is thought to be caused by inhibition of aldosterone secretion



Question 31 of 44

Next

A 55-year-old man with a history of type 2 diabetes mellitus, bipolar disorder and chronic obstructive pulmonary disease has bloods taken as part of his annual diabetic review:

Na ⁺	129 mmol/l
K ⁺	3.8 mmol/l
Bicarbonate	24 mmol/l
Urea	3.7 mmol/l
Creatinine	92 μ mol/l

Due to his smoking history a chest x-ray is ordered which is reported as normal. Which one of the following medications is most likely to be responsible?

- ☐ A. Metformin
- ☒ B. Sodium valproate
- ☒ C. Carbamazepine
- ☐ D. Betamethasone dipropionate inhaler
- ☐ E. Exenatide

Next question

SIADH - drug causes: carbamazepine, sulfonylureas, SSRIs, tricyclics

Carbamazepine is used for bipolar disorder that hasn't responded to first-line drugs

SIADH: causes

The syndrome of inappropriate ADH secretion (SIADH) is characterised by hyponatraemia secondary to the dilutional effects of excessive water retention.

Causes of SIADH

Category	Examples
Malignancy	<ul style="list-style-type: none"> • small cell lung cancer • also: pancreas, prostate
Neurological	<ul style="list-style-type: none"> • stroke • subarachnoid haemorrhage • subdural haemorrhage • meningitis/encephalitis/abscess
Infections	<ul style="list-style-type: none"> • tuberculosis • pneumonia
Drugs	<ul style="list-style-type: none"> • sulfonylureas

	<ul style="list-style-type: none"> • SSRIs, tricyclics • carbamazepine • vincristine • cyclophosphamide
Other causes	<ul style="list-style-type: none"> • positive end-expiratory pressure (PEEP) • porphyrias

Management

- correction must be done slowly to avoid precipitating central pontine myelinolysis
- fluid restriction
- demeclocycline: reduces the responsiveness of the collecting tubule cells to ADH
- ADH (vasopressin) receptor antagonists have been developed



Question 32 of 44

Next

A 70-year-old woman is reviewed in the chronic kidney disease clinic. She also has a history of hypertension for which she takes amlodipine 5mg od and ramipril 10mg od. Her most recent results are as follows:

Blood pressure today is 128/74 mmHg.

	Recent	12 months ago
Na ⁺	140 mmol/l	141 mmol/l
K ⁺	4.5 mmol/l	4.3 mmol/l
Urea	11.2 mmol/l	10.5 mmol/l
Creatinine	124 mol/l	114 mol/l
eGFR	39 ml/min	43 ml/min

What is the most appropriate next step in management?

✓	<input checked="" type="radio"/>	A. Start atorvastatin 20mg on
	<input type="radio"/>	B. Reduce ramipril to 5mg od and recheck U&Es in 4 weeks
✗	<input type="radio"/>	C. Start simvastatin 40mg on
	<input type="radio"/>	D. Increase amlodipine to 10mg od
	<input type="radio"/>	E. Check her QRISK2 score

Next question

QRISK2 should not be used in patients with chronic kidney diseases (CKD). NICE now recommends that all patients with CKD should take a statin.

Offer atorvastatin 20 mg for the primary or secondary prevention of CVD to people with CKD

- *Increase the dose if a greater than 40% reduction in nonHDL cholesterol is not achieved and eGFR is 30 ml/min*
- *Agree the use of higher doses with a renal specialist if eGFR is less than 30 ml/min*

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics

- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
- → older than 40 years, or
- → have had diabetes for more than 10 years or
- → have established nephropathy or
- → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 33 of 44

Next

Which of the following secondary causes of hyperlipidaemia result in predominantly hypercholesterolaemia, as opposed to hypertriglyceridaemia?



<input type="radio"/>	A. Diabetes mellitus
<input type="radio"/>	B. Bendrofluazide
<input checked="" type="radio"/>	C. Nephrotic syndrome
<input type="radio"/>	D. Alcohol
<input type="radio"/>	E. Obesity

Next question

Hypercholesterolaemia rather than hypertriglyceridaemia: nephrotic syndrome, cholestasis, hypothyroidism

Hyperlipidaemia: secondary causes

Causes of predominantly hypertriglyceridaemia

- diabetes mellitus (types 1 and 2)
- obesity
- alcohol
- chronic renal failure
- drugs: thiazides, non-selective beta-blockers, unopposed oestrogen
- liver disease

Causes of predominantly hypercholesterolaemia

- nephrotic syndrome
- cholestasis
- hypothyroidism



Question 34 of 44

Next

A 29-year-old man presents concerned about his weight. His body mass index is 38 kg/m². Which one of the following best describes his weight?



- ☐ A. Morbidly obese (Obese III)
- ☐ B. Normal
- ☐ C. Overweight
- ☒ D. Clinically obese (Obese II)
- ☐ E. Obese (Obese I)

Next question

Body mass index

Body mass index (BMI) is calculated by dividing the weight (in kilograms) by the height (in metres) squared

BMI	Old classification	NICE classification
< 18.5	Underweight	Underweight
18.5 - 24.9	Normal	Normal
25 - 29.9	Overweight	Overweight
30 - 34.9	Obese	Obese I

35 - 39.9	Clinically obese	Obese II
> 40	Morbidly obese	Obese III



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Next

You review a 21-year-old woman who has recently been diagnosed with type 1 diabetes mellitus. She was admitted three months ago with vomiting, abdominal pain and weight loss and was found to hyperglycaemic. A diagnosis of type 1 diabetes mellitus was made. She was started on insulin. Recent bloods show the following:

Na ⁺	140 mmol/l
K ⁺	3.8 mmol/l
Urea	3.4 mmol/l
Creatinine	72 μ mol/l

Total cholesterol	5.1 mmol/l
HDL cholesterol	1.0 mmol/l
LDL cholesterol	2.9 mmol/l
Triglyceride	1.7 mmol/l

Urine dip: No protein or blood

She has no family history of note and her body mass index is 20.5 kg/m². What is the most appropriate management with regards to lipid modification?



- ☐ A. Start atorvastatin 10mg on
- ☐ B. Start atorvastatin 20mg on
- ☐ C. Start atorvastatin 40mg on
- ☐ D. Perform a QRISK2 assessment
- ☒ E. Reassure her that lipid modification therapy is not required at this stage

NICE specifically state that we should not use QRISK2 for type 1 diabetics. Instead, the following criteria are used:

- older than 40 years, or
- have had diabetes for more than 10 years or
- have established nephropathy or
- have other CVD risk factors

None of these apply in this case.

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics
- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs

- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
- → older than 40 years, or

- → have had diabetes for more than 10 years or
- → have established nephropathy or
- → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible

- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation



- smokers should be encouraged to quit



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Next

A rise in alkaline phosphatase can be caused by each one of the following except:

- ☐ A. Pregnancy
- ☐ B. Paget's disease
-  ☐ C. Healing bone fractures
- ☐ D. Osteomalacia
-  ☐ E. Hypoparathyroidism

Next question

Alkaline phosphatase

Causes of raised alkaline phosphatase (ALP)

- liver: cholestasis, hepatitis, fatty liver, neoplasia
- Paget's
- osteomalacia
- bone metastases
- hyperparathyroidism
- renal failure
- physiological: pregnancy, growing children, healing fractures

The table below splits the causes according to the calcium level

Raised ALP and raised calcium	Raised ALP and low calcium
<ul style="list-style-type: none"> ◆ Bone metastases ◆ Hyperparathyroidism 	<ul style="list-style-type: none"> ◆ Osteomalacia ◆ Renal failure



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Next

You get phoned about a patient's potassium result:

K ⁺	6.3 mmol/l
----------------	------------

Which one of the following would not explain this result?

- ☐ A. Delay in transport to the laboratory
- ☐ B. Losartan therapy
- ☒ C. Addison's disease
- ☐ D. Acute renal failure
- ☒ E. Conn's syndrome

Next question

Conn's syndrome is associated with hypokalaemia.

Hyperkalaemia

Plasma potassium levels are regulated by a number of factors including aldosterone, acid-base balance and insulin levels. Metabolic acidosis is associated with hyperkalaemia as hydrogen and potassium ions compete with each other for exchange with sodium ions across cell membranes and in the distal tubule. ECG changes seen in hyperkalaemia include tall-tented T waves, small P waves, widened QRS leading to a sinusoidal pattern and asystole

Causes of hyperkalaemia:

- acute renal failure
- drugs*: potassium sparing diuretics, ACE inhibitors, angiotensin 2 receptor blockers, spironolactone, ciclosporin, heparin**
- metabolic acidosis
- Addison's
- rhabdomyolysis
- massive blood transfusion

Foods that are high in potassium:

- salt substitutes (i.e. Contain potassium rather than sodium)

- bananas, oranges, kiwi fruit, avocado, spinach, tomatoes

*beta-blockers interfere with potassium transport into cells and can potentially cause hyperkalaemia in renal failure patients - remember beta-agonists, e.g. Salbutamol, are sometimes used as emergency treatment

**both unfractionated and low-molecular weight heparin can cause hyperkalaemia. This is thought to be caused by inhibition of aldosterone secretion

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Next

Theme: Vitamin deficiency

A.	Vitamin A
B.	Thiamine
C.	Niacin
D.	Pyridoxine
E.	Folic acid
F.	Vitamin B12
G.	Vitamin C
H.	Vitamin D
I.	Vitamin E
J.	Vitamin K

For each one of the following scenarios select the vitamin which may cause these features if deficient:

38. Wernicke-Korsakoff syndrome

 Thiamine

39. Neural tube defects

✓ Folic acid

40. Haemorrhagic disease of the newborn

✓ Vitamin K

Next question

Vitamin deficiency

The table below summarises vitamin deficiency states

Vitamin	Chemical name	Deficiency state
A	Retinoids	Night-blindness (nyctalopia)
B1	Thiamine	Beriberi <ul style="list-style-type: none">polyneuropathy, Wernicke-Korsakoff syndromeheart failure
B3	Niacin	Pellagra <ul style="list-style-type: none">dermatitisdiarrhoeadementia
B6	Pyridoxine	Anaemia, irritability, seizures
B7	Biotin	Dermatitis, seborrhoea
B9	Folic acid	Megaloblastic anaemia, deficiency during pregnancy - neural tube defects

B12	Cyanocobalamin	Megaloblastic anaemia, peripheral neuropathy
C	Ascorbic acid	Scurvy <ul style="list-style-type: none"> • gingivitis • bleeding
D	Ergocalciferol, cholecalciferol	Rickets, osteomalacia
E	Tocopherol, tocotrienol	Mild haemolytic anaemia in newborn infants, ataxia, peripheral neuropathy
K	Naphthoquinone	Haemorrhagic disease of the newborn, bleeding diathesis



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Next

A 33-year-old woman who is known to have familial hypercholesterolaemia comes for review. She is planning to have children and asks for advice regarding medication as she currently takes atorvastatin 80mg on. What is the most appropriate advice?



- ☐ A. Switch to atorvastatin 10mg
- ☐ B. Continue current drug at same dose
- ☒ C. Stop atorvastatin before trying to conceive
- ☐ D. Switch to ezetimibe
- ☐ E. Switch to simvastatin 40mg

Next question

Statins should be discontinued in women 3 months before conception due to the risk of congenital defects

Familial hypercholesterolaemia

Familial hypercholesterolaemia (FH) is an autosomal dominant condition that is thought to affect around 1 in 500 people. It results in high levels of LDL-cholesterol which, if untreated, may cause early cardiovascular disease (CVD). FH is caused by mutations in the gene which encodes the LDL-receptor protein.

Clinical diagnosis is now based on the **Simon Broome criteria**:

- in adults total cholesterol (TC) > 7.5 mmol/l and LDL-C > 4.9 mmol/l or children TC > 6.7 mmol/l and LDL-C > 4.0 mmol/l, plus:
- for definite FH: tendon xanthoma in patients or 1st or 2nd degree relatives or DNA-based evidence of FH
- for possible FH: family history of myocardial infarction below age 50 years in 2nd degree relative, below age 60 in 1st degree relative, or a family history of raised cholesterol levels

Management



- the use of CVD risk estimation using standard tables is not appropriate in FH as they do not accurately reflect the risk of CVD
- referral to a specialist lipid clinic is usually required
- the maximum dose of potent statins are usually required
- first-degree relatives have a 50% chance of having the disorder and should therefore be offered screening. This includes children who should be screened by the age of 10 years if there is one affected parent
- statins should be discontinued in women 3 months before conception due to the risk of congenital defects



Question 42 of 44

Next

A 52-year-old woman is started on atorvastatin 20mg as her QRISK2 score is calculated at 13%. She is a current smoker and is treated for hypertension with ramipril 5mg od. She is keen to lower her risk and asks whether she should join a gym. Which one of the following best represents NICE advice with regards to physical activity?

-  ☐ A. Undertake moderate exercise that will cause an increase in heart rate at least 3 times a week
- ☐ B. At least 300 minutes of moderate intensity aerobic activity or 150 minutes of vigorous intensity aerobic activity
-  ☒ C. At least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity
- ☐ D. At least 100 minutes of moderate intensity aerobic activity or 50 minutes of vigorous intensity aerobic activity
- ☐ E. At least 50 minutes of moderate intensity aerobic activity or 25 minutes of vigorous intensity aerobic activity

Next question

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

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- type 1 diabetics
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NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
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Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checked to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

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- → have established nephropathy or
- → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

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- intake of dietary cholesterol should be < 300 mg/day
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- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



A 52-year-old has a fasting lipid profile checked as part of an annual occupational health check. Combined with his blood pressure and current smoking status his 10-year risk of cardiovascular disease is calculated to be 23% percent. Following appropriate counselling he chooses to start atorvastatin 20mg. He is followed up 3 months later when a full lipid profile is repeated. What should his target be?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. A greater than 40% reduction in non-HDL cholesterol |
| <input type="radio"/> | B. Total cholesterol < 5 mmol/l |
| <input type="radio"/> | C. Target cholesterol is inappropriate in this situation |
| <input type="radio"/> | D. Total cholesterol < 4 mmol/l |
| <input type="radio"/> | E. Total cholesterol:HDL ratio < 4 |

Next question

In the primary prevention of CVD using statins aim for a reduction in non-HDL cholesterol of > 40%

Hyperlipidaemia: management

In 2014 NICE updated their guidelines on lipid modification. This proved highly controversial as it meant that we should be recommending statins to a significant proportion of the population over the age of 60 years. Anyway, the key points of the new guidelines are summarised below.

Primary prevention - who and how to assess risk

A systematic strategy should be used to identify people aged over 40 years who are likely to be at high risk of cardiovascular disease (CVD), defined as a 10-year risk of **10%** or greater.

NICE recommend we use the **QRISK2** CVD risk assessment tool for patients aged ≤ 84 years. Patients ≥ 85 years are at high risk of CVD due to their age. QRISK2 should not be used in the following situations as there are more specific guidelines for these patient groups:

- type 1 diabetics
- patients with an estimated glomerular filtration rate (eGFR) less than 60 ml/min and/or albuminuria
- patients with a history of familial hyperlipidaemia

NICE suggest QRISK2 may underestimate CVD risk in the following population groups:

- people treated for HIV
- people with serious mental health problems
- people taking medicines that can cause dyslipidaemia such as antipsychotics, corticosteroids or immunosuppressant drugs
- people with autoimmune disorders/systemic inflammatory disorders such as systemic lupus erythematosus

Measuring lipid levels

When measuring lipids both the total cholesterol and HDL should be checking to provide the most accurate risk of CVD. A full lipid profile should also be checked (i.e. including triglycerides) before starting a statin. The samples does not need to be fasting.

In the vast majority of patient the cholesterol measurements will be fed into the QRISK2 tool. If however the patient's cholesterol is very high we should consider familial hyperlipidaemia. NICE recommend the following that we should consider the possibility of familial hypercholesterolaemia and investigate further if the total cholesterol concentration is > 7.5 mmol/l and there is a family history of premature coronary heart disease. They also recommend referring people with a total cholesterol > 9.0 mmol/l or a non-HDL cholesterol (i.e. LDL) of > 7.5 mmol/l even in the absence of a first-degree family history of premature coronary heart disease.

Interpreting the QRISK2 result

Probably the headline changes in the 2014 guidelines was the new, lower cut-off of 10-year CVD risk cut-off of 10%.

NICE now recommend we offer a statin to people with a QRISK2 10-year risk of $\geq 10\%$

Lifestyle factors are of course important and NICE recommend that we give patients the option of having their CVD risk reassessed after a period of time before starting a statin.

Atorvastatin 20mg should be offered first-line.

Special situations

Type 1 diabetes mellitus

- NICE recommend that we 'consider statin treatment for the primary prevention of CVD in all adults with type 1 diabetes'
- atorvastatin 20 mg should be offered if type 1 diabetics who are:
 - → older than 40 years, or
 - → have had diabetes for more than 10 years or
 - → have established nephropathy or
 - → have other CVD risk factors

Chronic kidney disease (CKD)

- atorvastatin 20mg should be offered to patients with CKD
- increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved and the eGFR > 30 ml/min. If the eGFR is < 30 ml/min a renal specialist should be consulted before increasing the dose

Secondary prevention

All patients with CVD should be taking a statin in the absence of any contraindication.

Atorvastatin 80mg should be offered first-line.

Follow-up of people started on statins

NICE recommend we follow-up patients at 3 months

- repeat a full lipid profile
- if the non-HDL cholesterol has not fallen by at least 40% concordance and lifestyle changes should be discussed with the patient
- NICE recommend we consider increasing the dose of atorvastatin up to 80mg

Lifestyle modifications

These are in many ways predictable but NICE make a number of specific points:

Cardioprotective diet

- total fat intake should be $\leq 30\%$ of total energy intake
- saturated fats should be $\leq 7\%$ of total energy intake
- intake of dietary cholesterol should be < 300 mg/day
- saturated fats should be replaced by monounsaturated and polyunsaturated fats where possible
- replace saturated and monounsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils
- choose wholegrain varieties of starchy food
- reduce their intake of sugar and food products containing refined sugars including fructose
- eat at least 5 portions of fruit and vegetables per day
- eat at least 2 portions of fish per week, including a portion of oily fish
- eat at least 4 to 5 portions of unsalted nuts, seeds and legumes per week

Physical activity

- each week aim for at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity or a mix of moderate and vigorous aerobic activity
- do musclestrengthening activities on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) in line with national guidance for the general population

Weight management

- no specific advice is given, overweight patients should be managed in keeping with relevant NICE guidance

Alcohol intake

- again no specific advice, other than the general recommendation that males drink no more than 3-4 units/day and females no more than 2-3 units/day

Smoking cessation

- smokers should be encouraged to quit



Question 44 of 44

A 58-year-old woman complains of aches and pains in her bones. Her family have noticed she is generally weak and lethargic. A series of blood tests are requested:

Calcium	2.04 mmol/l
Albumin	39 g/l
Phosphate	0.63 mmol/l
Alkaline phosphatase	271 U/l
Vitamin D3	15 nmol/l (75-200 nmol/l)
Parathyroid hormone	10.8 pmol/l (0.8 - 8.5 pmol/l)

What is the most appropriate management?



- ☐ A. Arrange a liver ultrasound
- ☐ B. Refer for a technetium-MIBI subtraction scan
- ☐ C. Arrange a DEXA scan
- ☐ D. Arrange serum electrophoresis and a skeletal survey
- ☒ E. Start vitamin D3 supplementation

The low calcium, phosphate and vitamin D levels combined with a raised alkaline phosphatase and parathyroid hormone level is entirely consistent with osteomalacia, or vitamin D deficiency. The treatment of choice is therefore vitamin D3 supplementation.

Remember blood values are normal in osteoporosis. Myeloma ('Arrange serum electrophoresis and a skeletal survey') and primary hyperparathyroidism ('Refer for a technetium-MIBI subtraction scan') are associated with hyper- rather than hypocalcaemia.

Osteomalacia

Basics

- normal bony tissue but decreased mineral content
- rickets if when growing
- osteomalacia if after epiphysis fusion

Types

- vitamin D deficiency e.g. malabsorption, lack of sunlight, diet
- renal failure
- drug induced e.g. anticonvulsants
- vitamin D resistant; inherited
- liver disease, e.g. cirrhosis

Features

- rickets: knock-knee, bow leg, features of hypocalcaemia
- osteomalacia: bone pain, fractures, muscle tenderness, proximal myopathy

Investigation

- low calcium, phosphate, 25(OH) vitamin D
- raised alkaline phosphatase
- x-ray: children - cupped, ragged metaphyseal surfaces; adults - translucent bands (Looser's zones or pseudofractures)

Treatment

- calcium with vitamin D tablets



Question 1 of 23

Next

A 54-year-old man with stage 4 chronic kidney disease presents for review. Which one of the following drugs is it most important to avoid?



<input type="radio"/>	A. Erythromycin
<input type="radio"/>	B. Diazepam
<input type="radio"/>	C. Rifampicin
<input checked="" type="radio"/>	D. Tetracycline
<input type="radio"/>	E. Warfarin



Next question

Prescribing in patients with renal failure

Questions regarding which drugs to avoid in renal failure are common

Drugs to avoid in renal failure

- antibiotics: tetracycline, nitrofurantoin
- NSAIDs
- lithium
- metformin

Drugs likely to accumulate in chronic kidney disease - need dose adjustment

- most antibiotics including penicillins, cephalosporins, vancomycin, gentamicin, streptomycin
- digoxin, atenolol
- methotrexate
- sulphonylureas
- furosemide
- opioids

Drugs relatively safe - can sometimes use normal dose depending on the degree of chronic kidney disease

- antibiotics: erythromycin, rifampicin
- diazepam
- warfarin

0 / 3 **Question 2-4 of 23**

Next

Theme: Haematuria

A.	Transitional cell carcinoma of the bladder
B.	Renal stones
C.	<i>Chlamydia</i>
D.	IgA nephropathy
E.	Urinary tract infection
F.	Renal cell carcinoma
G.	Polycystic kidney disease
H.	Goodpasture's syndrome
I.	Urethral syndrome
J.	Renal vein thrombosis

For each one of the following scenarios please select the most likely diagnosis:

2. A 14-year-old boy develops visible haematuria following an upper respiratory tract infection.

 You answered Transitional cell carcinoma of the bladder

The correct answer is IgA nephropathy

IgA nephropathy is also called Berger's disease.

3. A 60-year-old man presents with visible haematuria for the past three weeks. He has an ache in the left loin but examination is unremarkable other than a left varicocele. He also notes to feeling intermittently hot and sweaty.

 You answered Transitional cell carcinoma of the bladder

The correct answer is Renal cell carcinoma

Features of renal cell carcinoma:

- classical triad: haematuria, loin pain, abdominal mass
 - pyrexia of unknown origin
 - left varicocele (due to occlusion of left testicular vein)
 - endocrine effects: may secrete erythropoietin (polycythaemia), parathyroid hormone (hypercalcaemia), renin, ACTH
 - 25% have metastases at presentation
4. A 21-year-old female complains of dysuria for the past week, despite just completing a three day course of trimethoprim. Urine dipstick is positive for blood + and leucocytes +. A MSSU shows no organism.

 You answered Transitional cell carcinoma of the bladder

The correct answer is *Chlamydia*

Features of *Chlamydia*

- asymptomatic in around 70% of women and 50% of men
- women: cervicitis (discharge, bleeding), dysuria
- men: urethral discharge, dysuria

[Next question](#)

Haematuria

The management of patients with haematuria is often difficult due to the absence of widely followed guidelines. It is sometimes unclear whether patients are best managed in primary care, by urologists or by nephrologists.

The terminology surrounding haematuria is changing. Microscopic or dipstick positive haematuria is

increasingly termed non-visible haematuria whilst macroscopic haematuria is termed visible haematuria. Non-visible haematuria is found in around 2.5% of the population.

Causes of transient or spurious non-visible haematuria

- urinary tract infection
- menstruation
- vigorous exercise (this normally settles after around 3 days)
- sexual intercourse

Causes of persistent non-visible haematuria

- cancer (bladder, renal, prostate)
- stones
- benign prostatic hyperplasia
- prostatitis
- urethritis e.g. *Chlamydia*
- renal causes: IgA nephropathy, thin basement membrane disease

Spurious causes - red/orange urine, where blood is not present on dipstick

- foods: beetroot, rhubarb
- drugs: rifampicin, doxorubicin

Management

Current evidence does not support screening for haematuria. The incidence of non-visible haematuria is similar in patients taking aspirin/warfarin to the general population hence these patients should also be investigated.

Testing

- urine dipstick is the test of choice for detecting haematuria
- persistent non-visible haematuria is often defined as blood being present in 2 out of 3 samples tested 2-3 weeks apart
- renal function, albumin:creatinine (ACR) or protein:creatinine ratio (PCR) and blood pressure should also be checked

- urine microscopy may be used but time to analysis significantly affects the number of red blood cells detected

NICE urgent cancer referral guidelines

- of any age with painless macroscopic haematuria
- patients under the age of 40 years with normal renal function, no proteinuria and who are normotensive do not need to be referred and may be managed in primary care
- aged 40 years and older who present with recurrent or persistent urinary tract infection associated with haematuria
- aged 50 years and older who are found to have unexplained microscopic haematuria



Question 5 of 23

Next

A 62-year-old man with chronic kidney disease secondary to diabetes mellitus is reviewed. When assessing his estimated glomerular filtration rate (eGFR), which one of the following variables is not required by the Modification of Diet in Renal Disease (MDRD) equation?



<input type="radio"/>	A. Age
<input type="radio"/>	B. Serum creatinine
<input type="radio"/>	C. Ethnicity
<input type="radio"/>	D. Gender
<input checked="" type="radio"/>	E. Serum urea

Next question

eGFR variables - CAGE - **C**reatinine, **A**ge, **G**ender, **E**thnicity

Chronic kidney disease: eGFR and classification

Serum creatinine may not provide an accurate estimate of renal function due to differences in muscle. For this reason formulas were developed to help estimate the glomerular filtration rate (estimated GFR or eGFR). The most commonly used formula is the Modification of Diet in Renal Disease (MDRD) equation, which uses the following variables:

- serum creatinine
- age
- gender
- ethnicity

Factors which may affect the result

- pregnancy
- muscle mass (e.g. amputees, body-builders)
- eating red meat 12 hours prior to the sample being taken

CKD may be classified according to GFR:

CKD stage	GFR range
1	Greater than 90 ml/min, with some sign of kidney damage on other tests (if all the kidney tests* are normal, there is no CKD)
2	60-90 ml/min with some sign of kidney damage (if kidney tests* are normal, there is no CKD)
3a	45-59 ml/min, a moderate reduction in kidney function
3b	30-44 ml/min, a moderate reduction in kidney function
4	15-29 ml/min, a severe reduction in kidney function
5	Less than 15 ml/min, established kidney failure - dialysis or a kidney transplant may be needed

*i.e. normal U&Es and no proteinuria



Question 6 of 23

Next



A 45-year-old woman with type 1 diabetes mellitus is reviewed in the diabetes clinic. Three months ago her blood tests were as followed:

K ⁺	4.5 mmol/l
Creatinine	116 µmol/l
eGFR	47 ml/min

At the time she was started on lisinopril to treat both the hypertension and act as a renoprotective agent. Lisinopril had been titrated up to treatment dose. Her current bloods are as follows:

K ⁺	4.9 mmol/l
Creatinine	123 µmol/l
eGFR	44 ml/min

Of the following options, what is the most appropriate course of action?

- ☐ A. Stop lisinopril and arrange investigations to exclude renal artery stenosis
-  ☒ B. Switch to an angiotensin 2 receptor blocker
- ☐ C. Switch to a different ACE inhibitor
-  ☒ D. No action
- ☐ E. Reduce dose of lisinopril

Next question

The small change in both the creatinine and eGFR are acceptable and below the threshold where ACE inhibitors should be stopped

Chronic kidney disease: hypertension

The majority of patients with chronic kidney disease (CKD) will require more than two drugs to treat hypertension. ACE inhibitors are first line and are particularly helpful in proteinuric renal disease (e.g. diabetic nephropathy). As these drugs tend to reduce filtration pressure a small fall in glomerular filtration pressure (GFR) and rise in creatinine can be expected. NICE suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable, although any rise

should prompt careful monitoring and exclusion of other causes (e.g. NSAIDs). A rise greater than this may indicate underlying renovascular disease.

Furosemide is useful as an anti-hypertensive in patients with CKD, particularly when the GFR falls to below 45 ml/min*. It has the added benefit of lowering serum potassium. High doses are usually required. If the patient becomes at risk of dehydration (e.g. Gastroenteritis) then consideration should be given to temporarily stopping the drug

*the NKF K/DOQI guidelines suggest a lower cut-off of less than 30 ml/min



Question 7 of 23

Next

One of your patients with chronic kidney disease stage 4 has his annual bloods done:

Hb	9.4 g/dl
Platelets	$166 \times 10^9/l$
WBC	$6.7 \times 10^9/l$

He is currently under the renal team and has recently been started on erythropoietin. What will his target haemoglobin be?



A. 10-12 g/dl



B. Normal for gender



C. 9-11 g/dl



D. 9-10 g/dl



E. 11-13 g/dl

Next question

Anaemia in CKD - aim for 10-12 g/dl

Chronic kidney disease: anaemia

Patients with chronic kidney disease (CKD) may develop anaemia due to a variety of factors, the most significant of which is reduced erythropoietin levels. This is usually a normochromic normocytic anaemia and becomes apparent when the GFR is less than 35 ml/min (other causes of anaemia should be considered if the GFR is > 60 ml/min). Anaemia in CKD predisposes to the development of left ventricular hypertrophy - associated with a three fold increase in mortality in renal patients

Causes of anaemia in renal failure

- reduced erythropoietin levels - the most significant factor
- reduced erythropoiesis due to toxic effects of uraemia on bone marrow
- reduced absorption of iron
- anorexia/nausea due to uraemia
- reduced red cell survival (especially in haemodialysis)
- blood loss due to capillary fragility and poor platelet function
- stress ulceration leading to chronic blood loss

Management

- the 2011 NICE guidelines suggest a target haemoglobin of 10 - 12 g/dl
- determination and optimisation of iron status should be carried out prior to the administration of erythropoiesis-stimulating agents (ESA). Many patients, especially those on haemodialysis, will require IV iron
- ESAs such as erythropoietin and darbepoetin should be used in those 'who are likely to benefit in terms of quality of life and physical function'



Question 8 of 23

Next

A 65-year-old man presents to your clinic with lethargy and leg swelling. You organise some bloods which show the following:

Na+	138 mmol/l
-----	------------

K+	5.6 mmol/l
Urea	19.3 mmol/l
Creatinine	299 μ mol/l

His renal function six months ago was normal. Which one of his regular medications is it most important to stop straight away?

- ✓ ☒ A. Ibuprofen
- ☐ B. Warfarin
- ☐ C. Paracetamol
- ☐ D. Diazepam
- ☐ E. Atenolol

Next question

NSAIDs such as ibuprofen can significantly worsen renal impairment and must be avoided in patients with acute kidney injury or chronic kidney disease.

Prescribing in patients with renal failure

Questions regarding which drugs to avoid in renal failure are common

Drugs to avoid in renal failure

- antibiotics: tetracycline, nitrofurantoin
- NSAIDs
- lithium
- metformin

Drugs likely to accumulate in chronic kidney disease - need dose adjustment

- most antibiotics including penicillins, cephalosporins, vancomycin, gentamicin, streptomycin
- digoxin, atenolol
- methotrexate
- sulphonylureas
- furosemide

- opioids

Drugs relatively safe - can sometimes use normal dose depending on the degree of chronic kidney disease

- antibiotics: erythromycin, rifampicin
- diazepam
- warfarin



Question 9 of 23

Next

A 65-year-old man with a history of hypertension is reviewed. As part of routine blood tests to monitor his renal function whilst taking ramipril the following blood tests are received:

Na ⁺	140 mmol/l
K ⁺	4.8 mmol/l
Urea	6.2 mmol/l
Creatinine	102 µmol/l
eGFR	68 ml/min

A urine dipstick is subsequently performed which is normal and a renal ultrasound sound shows normal sized kidneys with no abnormality detected. What stage of chronic kidney disease does this patient have?



- ☒ **A.** No chronic kidney disease
- ☐ **B.** Chronic kidney disease stage 4
-  ☐ **C.** Chronic kidney disease stage 3
- ☐ **D.** Chronic kidney disease stage 2
- ☐ **E.** Chronic kidney disease stage 1

Next question

CKD: only diagnose stages 1 & 2 if supporting evidence to accompany eGFR

Chronic kidney disease is only diagnosed in this situation if supporting tests such as urinalysis or renal ultrasound are abnormal

Chronic kidney disease: eGFR and classification

Serum creatinine may not provide an accurate estimate of renal function due to differences in muscle. For this reason formulas were developed to help estimate the glomerular filtration rate (estimated GFR or eGFR). The most commonly used formula is the Modification of Diet in Renal Disease (MDRD) equation, which uses the following variables:

- serum creatinine
- age
- gender
- ethnicity

Factors which may affect the result

- pregnancy
- muscle mass (e.g. amputees, body-builders)
- eating red meat 12 hours prior to the sample being taken

CKD may be classified according to GFR:

CKD stage	GFR range
1	Greater than 90 ml/min, with some sign of kidney damage on other tests (if all the kidney tests* are normal, there is no CKD)
2	60-90 ml/min with some sign of kidney damage (if kidney tests* are normal, there is no CKD)
3a	45-59 ml/min, a moderate reduction in kidney function
3b	30-44 ml/min, a moderate reduction in kidney function

CKD stage	GFR range
4	15-29 ml/min, a severe reduction in kidney function
5	Less than 15 ml/min, established kidney failure - dialysis or a kidney transplant may be needed

*i.e. normal U&Es and no proteinuria



Question 10 of 23

Next

A 24-year-old man who has a sister with adult polycystic kidney disease asks his GP if he could be screened for the disease. What is the most appropriate screening test?

- ☐ A. PKD1 gene testing
- ☒ B. CT abdomen
- ☐ C. Urine microscopy
- ☒ D. Ultrasound abdomen
- ☐ E. Anti-polycystin 1 antibodies levels

Next question

Ultrasound is the screening test for adult polycystic kidney disease

Genetic testing is still not routinely recommended for screening family members

ADPKD

Autosomal dominant polycystic kidney disease (ADPKD) is the most common inherited cause of kidney disease, affecting 1 in 1,000 Caucasians. Two disease loci have been identified, PKD1 and PKD2, which code for polycystin-1 and polycystin-2 respectively

ADPKD type 1	ADPKD type 2
85% of cases	15% of cases
Chromosome 16	Chromosome 4
Presents with renal failure earlier	

The screening investigation for relatives is abdominal ultrasound:

Ultrasound diagnostic criteria (in patients with positive family history)

- two cysts, unilateral or bilateral, if aged < 30 years
- two cysts in both kidneys if aged 30-59 years
- four cysts in both kidneys if aged > 60 years



Question 11 of 23

Next

You are reviewing a 65-year-old in the renal clinic. He has been on haemodialysis for chronic kidney disease for the past 6 years. What is he most likely to die from?

- ☐ A. Hyperkalaemia
-  ☐ B. Malignancy
- ☐ C. Dilated cardiomyopathy
- ☐ D. Dialysis related sepsis
-  ☒ E. Ischaemic heart disease

Next question

CKD on haemodialysis - most likely cause of death is IHD

Cardiovascular events account for 50% of the mortality in patients receiving dialysis.

Chronic kidney disease: causes

Common causes of chronic kidney disease

- diabetic nephropathy
- chronic glomerulonephritis
- chronic pyelonephritis
- hypertension
- adult polycystic kidney disease



Question 12 of 23

Next

A 71-year-old man with chronic kidney disease stage 3 is reviewed. He is known to have hypertension and ischaemic heart disease but a recent fasting glucose result confirmed he is not diabetic. A recent early morning urine result is reported as follows:

Albumin:creatinine ratio	5.2 mg/mmol
--------------------------	-------------

What is the most appropriate action?



- ☐ A. Refer to a nephrologist
- ☒ B. No action as not clinically significant
- ☐ C. Obtain a 24-hour urine collection
- ☐ D. Repeat using a late-evening sample
- ☐ E. Arrange renovascular imaging

Next question

As he is not diabetic this result is not clinically significant

Chronic kidney disease: proteinuria

Proteinuria is an important marker of chronic kidney disease, especially for diabetic nephropathy. NICE recommend using the albumin:creatinine ratio (ACR) in preference to the protein:creatinine ratio (PCR) when identifying patients with proteinuria as it has greater sensitivity. For quantification and monitoring of proteinuria, PCR can be used as an alternative, although ACR is recommended in diabetics. Urine reagent strips are not recommended unless they express the result as an ACR

Approximate equivalent values

ACR (mg/mmol)	PCR (mg/mmol)	Urinary protein excretion (g/24 h)
30	50	0.5
70	100	1

Collecting an ACR sample

- by collecting a 'spot' sample it avoids the need to collect urine over a 24 hour period in order to detect or quantify proteinuria
- should be a first-pass morning urine specimen
- if the initial ACR is greater than 30 mg/mmol and less than 70 mg/mmol, confirm by a subsequent early morning sample. If the initial ACR is greater than 70 mg/mmol a repeat sample need not be tested

Interpreting the ACR results



- in non-diabetics an ACR greater than 30 mg/mmol is considered clinically significant proteinuria
- in diabetics microalbuminuria (ACR greater than 2.5 mg/mmol in men and ACR greater than 3.5 mg/mmol in women) is considered clinically significant



Question 13 of 23

Next

Which one of the following statements regarding the assessment of proteinuria in patients with chronic kidney disease is incorrect?

- ☐ A. Albumin:creatinine ratio (ACR) is more sensitive than protein:creatinine ratio (PCR)
-  ☐ B. An ACR of 30 mg/mmol is approximately equal to a PCR of 50 mg/mmol
-  ☒ C. An ACR sample is collected over 24 hours
- ☐ D. Women typically have higher ACR values
- ☐ E. An ACR of 3.1 mg/mmol in a diabetic man is clinically significant

Next question

Chronic kidney disease: proteinuria

Proteinuria is an important marker of chronic kidney disease, especially for diabetic nephropathy. NICE recommend using the albumin:creatinine ratio (ACR) in preference to the protein:creatinine ratio (PCR) when identifying patients with proteinuria as it has greater sensitivity. For quantification and monitoring of proteinuria, PCR can be used as an alternative, although ACR is recommended in diabetics. Urine reagent strips are not recommended unless they express the result as an ACR

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Collecting an ACR sample

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- should be a first-pass morning urine specimen
- if the initial ACR is greater than 30 mg/mmol and less than 70 mg/mmol, confirm by a subsequent early morning sample. If the initial ACR is greater than 70 mg/mmol a repeat sample need not be tested

Interpreting the ACR results

- in non-diabetics an ACR greater than 30 mg/mmol is considered clinically significant proteinuria
- in diabetics microalbuminuria (ACR greater than 2.5 mg/mmol in men and ACR greater than 3.5 mg/mmol in women) is considered clinically significant



Question 14 of 23

Next

A 29-year-old man has his renal function checked. The eGFR is calculated to be 54 ml/min. Which one of the following factors is most likely to explain this unexpectedly low result?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Drinking a large amount of milk |
| <input checked="" type="radio"/> | B. Being dehydrated when the blood sample was taken |
| <input type="radio"/> | C. Being very tall |
| <input type="radio"/> | D. Excessive alcohol intake |
| <input checked="" type="radio"/> | E. Large muscle mass secondary to body building |

Next question

The eGFR is often inaccurate in people with extremes of muscle mass. Body builders often have an inappropriately low eGFR.

Chronic kidney disease: eGFR and classification

Serum creatinine may not provide an accurate estimate of renal function due to differences in muscle. For this reason formulas were developed to help estimate the glomerular filtration rate (estimated GFR or eGFR). The most commonly used formula is the Modification of Diet in Renal Disease (MDRD) equation, which uses the following variables:

- serum creatinine
- age

- gender
- ethnicity

Factors which may affect the result

- pregnancy
- muscle mass (e.g. amputees, body-builders)
- eating red meat 12 hours prior to the sample being taken

CKD may be classified according to GFR:

CKD stage	GFR range
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3a	45-59 ml/min, a moderate reduction in kidney function
3b	30-44 ml/min, a moderate reduction in kidney function
4	15-29 ml/min, a severe reduction in kidney function
5	Less than 15 ml/min, established kidney failure - dialysis or a kidney transplant may be needed

*i.e. normal U&Es and no proteinuria





Question 15 of 23

Next

A 67-year-old woman presents to her GP with symptoms of dysuria and increased urinary frequency. She is otherwise systemically well with no signs of sepsis. Urine dip in the GP surgery shows blood, leukocytes, protein and nitrites. The patients medical history is significant only for asthma for which she takes salbutamol and beclomethasone inhalers, hypertension for which she takes amlodipine 10mg daily and ramipril 5mg daily, and chronic kidney disease, stage 3.

Which of the following antibiotics is best avoided in the treatment of this patient's urine infection?

-  ☐ A. Amoxicillin
- ☐ B. Augmentin (amoxicillin and clavulanic acid)
- ☐ C. Ciprofloxacin
-  ☒ D. Nitrofurantoin
- ☐ E. Trimethoprim

Next question

Nitrofurantoin is best avoided in patients with CKD stage 3 or higher due to the significant risk of treatment failure and occurrence of side effects due to drug accumulation

This question is about antibiotic prescribing in chronic kidney disease (CKD). Many drugs need dose adjustment in renal disease due to changes in drug metabolism and also pharmacokinetics. Often this dose adjustment is made on the level of the estimated glomerular filtration rate (eGFR) which is a calculated surrogate of renal function using the serum creatinine. Stages of chronic kidney disease are classified according to the eGFR; stage 3 CKD equates to an eGFR of 30-59ml/min.

Nitrofurantoin is a relatively old and unique antibiotic which has enjoyed a new lease of life with increasing antibiotic resistance. It is actually an inactive pro-drug which is reduced in vivo to active forms by the bacterial flavoprotein nitrofuran reductase, and it is these reduced forms of the drug which exert their antibiotic properties by damaging bacterial proteins. In order to be effective at treating urinary tract infections, nitrofurantoin needs to be concentrated in the urine and an adequate glomerular filtration is required for this to occur. An eGFR of less than 40-60ml/min means that the drug is wholly ineffective as a bactericidal agent and is not recommended in patients with CKD stage 3 or worse due to the likelihood of treatment failure. Coupled with this is the risk of drug toxicity in the patient. Without adequate renal filtration, the drug is likely to accumulate. Although bacterial flavoproteins activate nitrofurantoin more readily, human enzymes can reduce this drug to generate many highly active radical species, which can cause side effects including peripheral neuropathy, which may not be reversible, hepatotoxicity and acute and chronic pulmonary reactions and fibrosis.

Patients taking nitrofurantoin should be advised that this drug will discolour the urine. It is also a safe drug to use in pregnancy except at full term when there is a risk of haemolysis in the neonate.

Amoxicillin and co-amoxiclav are widely used antibiotics in the treatment of urinary tract infections and are relatively safe in renal impairment. Dose reduction is recommended in severe chronic renal disease, i.e. an eGFR <15-30ml/min to avoid the risk of crystalluria. Similarly, a reduction in dose is necessary for ciprofloxacin in CKD to avoid crystalluria although this is recommended from an eGFR of 30-60ml/min.

Trimethoprim is an antibiotic which is entirely safe to use in all but the most severe forms of chronic kidney disease where a modest dose adjustment is required. It should be noted however that use of trimethoprim is likely to affect the results of renal function tests since the drug inhibits tubular secretion of creatinine leading to a rise in serum levels in all patients, including those with previously normal renal function. This is without any effect on the glomerular filtration rate.

Prescribing in patients with renal failure

Questions regarding which drugs to avoid in renal failure are common

Drugs to avoid in renal failure

- antibiotics: tetracycline, nitrofurantoin
- NSAIDs
- lithium
- metformin

Drugs likely to accumulate in chronic kidney disease - need dose adjustment

- most antibiotics including penicillins, cephalosporins, vancomycin, gentamicin, streptomycin
- digoxin, atenolol
- methotrexate
- sulphonylureas
- furosemide
- opioids

Drugs relatively safe - can sometimes use normal dose depending on the degree of chronic kidney disease


- antibiotics: erythromycin, rifampicin
- diazepam
- warfarin

Theme: Haematuria

- | | |
|----|--|
| A. | Transitional cell carcinoma of the bladder |
| B. | Renal stones |
| C. | Benign prostatic hyperplasia |
| D. | Wilms' nephroblastoma |
| E. | Urinary tract infection |
| F. | Renal cell carcinoma |
| G. | Polycystic kidney disease |
| H. | Goodpasture's syndrome |
| I. | Rhabdomyosarcoma |
| J. | Renal vein thrombosis |

For each one of the following scenarios please select the most likely diagnosis:

16. A 68-year-old man presents with visible haematuria for the past two weeks. There is no history of pain. MSSU confirms haematuria but fails to show any organism.

 Transitional cell carcinoma of the bladder

Around 80% of patients present with painless, visible haematuria.

17. A 3-year-old girl is brought to surgery as her parents have noticed blood in her urine. Examinations reveals a loin mass. MSU shows no evidence of a urinary tract infection. The only relevant family history is her grandmother who has chronic kidney disease.

 You answered Transitional cell carcinoma of the bladder

The correct answer is Wilms' nephroblastoma

Wilms' nephroblastoma is one of the most common childhood malignancies. It typically presents in children under 5 years of age, with a median age of 3 years old.

Features

- abdominal mass (most common presenting feature)
- flank pain

- painless haematuria
- other features: anorexia, fever
- unilateral in 95% of cases
- metastases are found in 20% of patients (most commonly lung)

18. A 57-year-old man presents with left sided abdominal pain radiating to his scrotum. The pain is severe and not controlled by a combination of paracetamol and ibuprofen. Urine dipstick shows: blood++, protein+, leucocytes++, nitrites negative. Clinical examination is unremarkable.

 You answered Transitional cell carcinoma of the bladder

The correct answer is Renal stones

[Next question](#)

Haematuria

The management of patients with haematuria is often difficult due to the absence of widely followed guidelines. It is sometimes unclear whether patients are best managed in primary care, by urologists or by nephrologists.

The terminology surrounding haematuria is changing. Microscopic or dipstick positive haematuria is increasingly termed non-visible haematuria whilst macroscopic haematuria is termed visible haematuria. Non-visible haematuria is found in around 2.5% of the population.

Causes of transient or spurious non-visible haematuria

- urinary tract infection
- menstruation
- vigorous exercise (this normally settles after around 3 days)
- sexual intercourse

Causes of persistent non-visible haematuria

- cancer (bladder, renal, prostate)
- stones
- benign prostatic hyperplasia

- prostatitis
- urethritis e.g. *Chlamydia*
- renal causes: IgA nephropathy, thin basement membrane disease

Spurious causes - red/orange urine, where blood is not present on dipstick

- foods: beetroot, rhubarb
- drugs: rifampicin, doxorubicin

Management

Current evidence does not support screening for haematuria. The incidence of non-visible haematuria is similar in patients taking aspirin/warfarin to the general population hence these patients should also be investigated.

Testing

- urine dipstick is the test of choice for detecting haematuria
- persistent non-visible haematuria is often defined as blood being present in 2 out of 3 samples tested 2-3 weeks apart
- renal function, albumin:creatinine (ACR) or protein:creatinine ratio (PCR) and blood pressure should also be checked
- urine microscopy may be used but time to analysis significantly affects the number of red blood cells detected

NICE urgent cancer referral guidelines

- of any age with painless macroscopic haematuria
- patients under the age of 40 years with normal renal function, no proteinuria and who are normotensive do not need to be referred and may be managed in primary care
- aged 40 years and older who present with recurrent or persistent urinary tract infection associated with haematuria
- aged 50 years and older who are found to have unexplained microscopic haematuria



A 54-year-old female with rheumatoid arthritis is noted to have proteinuria on annual review. Which one of the following drugs is most associated with the development of proteinuria?



A. Ciclosporin



B. Gold



C. Methotrexate



D. Infliximab



E. Sulfasalazine

Next question

Nephrotic syndrome: causes

Primary glomerulonephritis accounts for around 80% of cases

- minimal change glomerulonephritis (causes 80% in children, 30% in adults)
- membranous glomerulonephritis
- focal segmental glomerulosclerosis
- membranoproliferative glomerulonephritis

Systemic disease (about 20%)

- diabetes mellitus
- systemic lupus erythematosus
- amyloidosis

Drugs

- gold (sodium aurothiomalate), penicillamine

Others

- congenital
- neoplasia: carcinoma, lymphoma, leukaemia, myeloma
- infection: bacterial endocarditis, hepatitis B, malaria



Question 20 of 23

Next

A patient with chronic kidney disease stage 4 is started on lisinopril. Bloods are checked two weeks later. There have been no other changes to his medication and on examination the patient is volume replete. According to NICE, up to what increase in creatinine is acceptable following the introduction of an ACE inhibitor?



- | | |
|----------------------------------|----------------|
| <input type="radio"/> | A. No increase |
| <input type="radio"/> | B. 5% |
| <input type="radio"/> | C. 10% |
| <input type="radio"/> | D. 15% |
| <input checked="" type="radio"/> | E. 30% |



Next question

Chronic kidney disease: hypertension

The majority of patients with chronic kidney disease (CKD) will require more than two drugs to treat hypertension. ACE inhibitors are first line and are particularly helpful in proteinuric renal disease (e.g. diabetic nephropathy). As these drugs tend to reduce filtration pressure a small fall in glomerular filtration pressure (GFR) and rise in creatinine can be expected. NICE suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable, although any rise should prompt careful monitoring and exclusion of other causes (e.g. NSAIDs). A rise greater than this may indicate underlying renovascular disease.

Furosemide is useful as an anti-hypertensive in patients with CKD, particularly when the GFR falls to below 45 ml/min*. It has the added benefit of lowering serum potassium. High doses are usually

required. If the patient becomes at risk of dehydration (e.g. Gastroenteritis) then consideration should be given to temporarily stopping the drug

*the NKF K/DOQI guidelines suggest a lower cut-off of less than 30 ml/min



Question 21 of 23

Next

A 62-year-old man with a diabetic nephropathy and hypertension is reviewed. His current medication is insulin, bendroflumethiazide, ramipril and amlodipine. On examination blood pressure is 144/78 mmHg. Blood tests reveal the following:

Na ⁺	139 mmol/l
K ⁺	4.9 mmol/l
Urea	12.8 mmol/l
Creatinine	215 µmol/l
eGFR	29 ml/min

Renal function was similar to 3 months ago. What is the most appropriate action?



- ☐ A. No change to his medication
- ☒ B. Switch bendroflumethiazide to furosemide
- ☐ C. Add a beta-blocker
- ☐ D. Add spironolactone
- ☐ E. Stop ramipril

Next question

As the eGFR is 29 ml/min switching bendroflumethiazide to furosemide would be the next step in controlling his blood pressure. Please see the guidelines in the external links section

Chronic kidney disease: hypertension

The majority of patients with chronic kidney disease (CKD) will require more than two drugs to treat hypertension. ACE inhibitors are first line and are particularly helpful in proteinuric renal disease

(e.g. diabetic nephropathy). As these drugs tend to reduce filtration pressure a small fall in glomerular filtration pressure (GFR) and rise in creatinine can be expected. NICE suggest that a decrease in eGFR of up to 25% or a rise in creatinine of up to 30% is acceptable, although any rise should prompt careful monitoring and exclusion of other causes (e.g. NSAIDs). A rise greater than this may indicate underlying renovascular disease.

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*the NKF K/DOQI guidelines suggest a lower cut-off of less than 30 ml/min



Question 22 of 23

Next

You review a 57-year-old man with chronic kidney disease stage 3. Which one of the following drugs is it safe to prescribe given his degree of renal impairment?



- | | |
|----------------------------------|-------------------|
| <input type="radio"/> | A. Tetracycline |
| <input type="radio"/> | B. Metformin |
| <input checked="" type="radio"/> | C. Warfarin |
| <input type="radio"/> | D. Nitrofurantoin |
| <input type="radio"/> | E. Lithium |

Next question

Tetracycline, metformin, nitrofurantoin and lithium should be avoided in severe renal failure. Warfarin in contrast may be well tolerated although patients may require closer monitoring.

Prescribing in patients with renal failure

Questions regarding which drugs to avoid in renal failure are common

Drugs to avoid in renal failure

- antibiotics: tetracycline, nitrofurantoin
- NSAIDs
- lithium
- metformin

Drugs likely to accumulate in chronic kidney disease - need dose adjustment

- most antibiotics including penicillins, cephalosporins, vancomycin, gentamicin, streptomycin
- digoxin, atenolol
- methotrexate
- sulphonylureas
- furosemide
- opioids

Drugs relatively safe - can sometimes use normal dose depending on the degree of chronic kidney disease

- antibiotics: erythromycin, rifampicin
- diazepam
- warfarin



Question 23 of 23

Which one of the following factors is most likely to invalidate the use of the Modification of Diet in Renal Disease (MDRD) equation to calculate a patients eGFR?



<input type="radio"/>	A. Diuretic use
<input checked="" type="radio"/>	B. Pregnancy
<input type="radio"/>	C. Type 2 diabetes mellitus
<input type="radio"/>	D. Blood pressure of 180/110 mmHg
<input type="radio"/>	E. Female gender

GFR tends to increase during pregnancy although the eGFR may not reflect this.

Chronic kidney disease: eGFR and classification

Serum creatinine may not provide an accurate estimate of renal function due to differences in muscle. For this reason formulas were developed to help estimate the glomerular filtration rate (estimated GFR or eGFR). The most commonly used formula is the Modification of Diet in Renal Disease (MDRD) equation, which uses the following variables:

- serum creatinine
- age
- gender
- ethnicity

Factors which may affect the result

- pregnancy
- muscle mass (e.g. amputees, body-builders)
- eating red meat 12 hours prior to the sample being taken

CKD may be classified according to GFR:

CKD stage	GFR range
1	Greater than 90 ml/min, with some sign of kidney damage on other tests (if all the kidney tests* are normal, there is no CKD)
2	60-90 ml/min with some sign of kidney damage (if kidney tests* are normal, there is no CKD)
3a	45-59 ml/min, a moderate reduction in kidney function
3b	30-44 ml/min, a moderate reduction in kidney function
4	15-29 ml/min, a severe reduction in kidney function
5	Less than 15 ml/min, established kidney failure - dialysis or a kidney transplant may be needed

*i.e. normal U&Es and no proteinuria



Question 1 of 128

Next

A 27-year-old woman comes for review. She is having problems with increasingly frequent migraine attacks. She has tried a combination of paracetamol and ibuprofen to try and control the attacks but this seems to have had a limited effect. Her current medication includes paracetamol and ibuprofen as required and Cerazette.

What is the most appropriate medication to try and reduce the frequency of her migraine attacks?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Propranolol |
| <input type="radio"/> | B. Zolmitriptan |
| <input type="radio"/> | C. Topiramate |
| <input type="radio"/> | D. Amitriptyline |
| <input type="radio"/> | E. Switch Cerazette to a combined oral contraceptive pill |

Next question

Propranolol is preferable to topiramate in women of childbearing age (i.e. the majority of women with migraine)

NICE recommend either propranolol or topiramate for migraine prophylaxis.

The combined oral contraceptive pill is contraindicated given her history of migraine.

Zolmitriptan is useful to abort attacks but is not used for prophylaxis.

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 2 of 128

Next

A 41-year-old man who was diagnosed with epilepsy around 30 years ago comes to see you. He has heard there has been in change in driving regulations for epileptics. His epilepsy is currently

controlled with sodium valproate monotherapy. What is the minimum length of time he must be seizure free before driving his car?

-  ☐ A. 3 months
- ☐ B. 6 months
-  ☒ C. 12 months
- ☐ D. 2 years
- ☐ E. 5 years

[Next question](#)

DVLA: neurological disorders

The guidelines below relate to car/motorcycle use unless specifically stated. For obvious reasons, the rules relating to drivers of heavy goods vehicles tend to be much stricter

Specific rules

- first seizure: 6 months off driving*. For patients with established epilepsy they must be fit free for 12 months before being able to drive
- stroke or TIA: 1 month off driving
- multiple TIAs over short period of times: 3 months off driving
- craniotomy e.g. For meningioma: 1 year off driving**
- pituitary tumour: craniotomy: 6 months; trans-sphenoidal surgery 'can drive when there is no debarring residual impairment likely to affect safe driving'
- narcolepsy/cataplexy: cease driving on diagnosis, can restart once 'satisfactory control of symptoms'
- chronic neurological disorders e.g. multiple sclerosis, motor neuron disease: DVLA should be informed, complete PK1 form (application for driving licence holders state of health)

Syncope

- simple faint: no restriction
- single episode, explained and treated: 4 weeks off

- single episode, unexplained: 6 months off
- two or more episodes: 12 months off

*previously rule was 12 months. It is now 6 months off driving if the licence holder has undergone assessment by an appropriate specialist and no relevant abnormality has been identified on investigation, for example EEG and brain scan where indicated

**if the tumour is a benign meningioma and there is no seizure history, licence can be reconsidered 6 months after surgery if remains seizure free



Question 3 of 128

Next

A 25-year-old man presents for review. For the past year he has been experiencing headaches. These are now occurring around 5-6 times per month and typically 'last all day' when they occur. They are not associated with any form of aura. A typical headache is described as a severe throbbing on both sides of his head associated with nausea and lethargy. When he gets such a headache he typically goes to bed so he can 'sleep it off'. Before going to bed he typically takes one of his father's diclofenac tablets which seem to help.

Neurological examination is unremarkable.

What is the most likely diagnosis?



- | | |
|----------------------------------|---------------------------------|
| <input checked="" type="radio"/> | A. Migraine |
| <input type="radio"/> | B. Cluster headache |
| <input type="radio"/> | C. Medication-overuse headache |
| <input type="radio"/> | D. Tension headache |
| <input type="radio"/> | E. Raised intracranial pressure |

Next question

This headache is very likely to represent migraine. Much of the history is very typical, except that the majority of patients usually have unilateral symptoms.

There is no evidence of the kind of medication overuse that can result in regular headaches.

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none">• 1. unilateral location*• 2. pulsating quality (i.e., varying with the heartbeat)• 3. moderate or severe pain intensity• 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none">• 1. nausea and/or vomiting*• 2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral

- NICE also give more detail about typical auras:

Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance
- decreased level of consciousness.



Question 4 of 128

Next

You review a 70-year-old who has developed a tremor in his right hand. Which of the following best describes the typical symptoms seen in Parkinson's disease?



<input type="radio"/>	A. Resting tremor + bradykinesia + fasciculation
<input type="radio"/>	B. Intention tremor + chorea + lead-pipe rigidity
<input checked="" type="radio"/>	C. Resting tremor + bradykinesia + rigidity
<input type="radio"/>	D. Resting tremor + chorea + cogwheel rigidity
<input type="radio"/>	E. Intention tremor + bradykinesia + rigidity

Next question

Parkinson's disease: features

Parkinson's disease is a progressive neurodegenerative condition caused by degeneration of dopaminergic neurons in the substantia nigra.. This results in a classic triad of features: bradykinesia, tremor and rigidity. The symptoms of Parkinson's disease are characteristically asymmetrical.

Epidemiology

- around twice as common in men
- mean age of diagnosis is 65 years

Bradykinesia

- poverty of movement also seen, sometimes referred to as hypokinesia
- short, shuffling steps with reduced arm swinging
- difficulty in initiating movement

Tremor

- most marked at rest, 3-5 Hz
- worse when stressed or tired
- typically 'pill-rolling', i.e. in the thumb and index finger

Rigidity

- lead pipe
- cogwheel: due to superimposed tremor

Other characteristic features

- mask-like facies
- flexed posture
- micrographia
- drooling of saliva
- psychiatric features: depression is the most common feature (affects about 40%); dementia, psychosis and sleep disturbances may also occur
- impaired olfaction

- REM sleep behaviour disorder

Drug-induced parkinsonism has slightly different features to Parkinson's disease:

- motor symptoms are generally rapid onset and bilateral
- rigidity and rest tremor are uncommon



Question 5 of 128

Next

A 63-year-old man is diagnosed as having restless legs syndrome. What is the most relevant blood test to perform?



<input type="radio"/>	A. ESR
<input checked="" type="radio"/>	B. Ferritin
<input type="radio"/>	C. Blood glucose
<input type="radio"/>	D. Urea and electrolytes
<input type="radio"/>	E. Liver function tests

Next question

Restless legs syndrome - ferritin is the single most important blood test

A case could be made for all the above tests but a low serum ferritin is most likely to be a cause of secondary restless legs syndrome

Restless legs syndrome

Restless legs syndrome (RLS) is a syndrome of spontaneous, continuous lower limb movements that may be associated with paraesthesia. It is extremely common, affecting between 2-10% of the general population. Males and females are equally affected and a family history may be present

Clinical features

- uncontrollable urge to move legs (akathisia). Symptoms initially occur at night but as condition progresses may occur during the day. Symptoms are worse at rest
- paraesthesias e.g. 'crawling' or 'throbbing' sensations
- movements during sleep may be noted by the partner - periodic limb movements of sleep (PLMS)

Causes and associations

- there is a positive family history in 50% of patients with idiopathic RLS
- iron deficiency anaemia
- uraemia
- diabetes mellitus
- pregnancy

The diagnosis is clinical although bloods to exclude iron deficiency anaemia may be appropriate

Management

- simple measures: walking, stretching, massaging affected limbs
- treat any iron deficiency
- dopamine agonists are first-line treatment (e.g. Pramipexole, ropinirole)
- benzodiazepines
- gabapentin



Question 6 of 128

Next

A 44-year-old woman presents with pain in her right hand and forearm which has been getting worse for the past few weeks. There is no history of trauma. The pain is concentrated around the thumb and index finger and is often worse at night. Shaking her hand seems to provide some relief. On examination there is weakness of the abductor pollicis brevis and reduced sensation to fine touch at the index finger. What is the most likely diagnosis?

<input type="radio"/>	A. C6 entrapment neuropathy
<input type="radio"/>	B. Thoracic outlet syndrome
<input checked="" type="radio"/>	C. Carpal tunnel syndrome
<input type="radio"/>	D. Cervical rib
<input type="radio"/>	E. Pancoast's tumour

Next question

More proximal symptoms would be expected with a C6 entrapment neuropathy e.g. weakness of the biceps muscle or reduced biceps reflex.

Patients with carpal tunnel syndrome often get relief from shaking their hands and this may be an important clue in exam questions.

Carpal tunnel syndrome

Carpal tunnel syndrome is caused by compression of median nerve in the carpal tunnel.

History

- pain/pins and needles in thumb, index, middle finger
- unusually the symptoms may 'ascend' proximally
- patient shakes his hand to obtain relief, classically at night

Examination

- weakness of thumb abduction (abductor pollicis brevis)
- wasting of thenar eminence (NOT hypothenar)
- Tinel's sign: tapping causes paraesthesia
- Phalen's sign: flexion of wrist causes symptoms

Causes

- idiopathic
- pregnancy

- oedema e.g. heart failure
- lunate fracture
- rheumatoid arthritis

Electrophysiology

- motor + sensory: prolongation of the action potential

Treatment

- corticosteroid injection
- wrist splints at night
- surgical decompression (flexor retinaculum division)



Question 7 of 128

Next

A 60-year-old woman presents with a tremor. Which one of the following features would suggest a diagnosis of essential tremor rather than Parkinson's disease?



<input type="radio"/>	A. Difficulty in initiating movement
<input type="radio"/>	B. Tremor is worse following alcohol
<input type="radio"/>	C. Postural instability
<input type="radio"/>	D. Unilateral symptoms
<input checked="" type="radio"/>	E. Tremor is worse when the arms are outstretched



Next question

Difficulty in initiating movement (bradykinesia), postural instability and unilateral symptoms (initially) are typical of Parkinson's. Essential tremor symptoms are usually eased by alcohol.

Essential tremor

Essential tremor (previously called benign essential tremor) is an autosomal dominant condition which usually affects both upper limbs

Features

- postural tremor: worse if arms outstretched
- improved by alcohol and rest
- most common cause of titubation (head tremor)

Management

- propranolol is first-line
- primidone is sometimes used



Question 8 of 128

Next

A home visit is requested by the husband of a 71-year-old woman who is 'off her legs'. On arriving the patient states that since mid-morning her left arm has felt weak and a degree of facial asymmetry is noted when she smiles. She is normally fit and well other than a past history of hypertension for which she takes ramipril. What is the most appropriate action?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Arrange same-day medical admission |
| <input checked="" type="radio"/> | B. Dial 999 for emergency admission |
| <input type="radio"/> | C. Arrange review at rapid access TIA clinic |
| <input type="radio"/> | D. Arrange review at rapid access TIA clinic + give aspirin 300 mg |
| <input type="radio"/> | E. Dial 999 for emergency admission + give aspirin 300 mg |

Next question

This lady is most likely having a stroke, nowadays rightly recognised as a medical emergency. Aspirin should only be given once a haemorrhagic stroke has been excluded

Stroke: management

The Royal College of Physicians (RCP) published guidelines on the diagnosis and management of patients following a stroke in 2004. NICE also issued stroke guidelines in 2008, although they modified their guidance with respect to antiplatelet therapy in 2010.

Selected points relating to the management of acute stroke include:

- blood glucose, hydration, oxygen saturation and temperature should be maintained within normal limits
- blood pressure should not be lowered in the acute phase unless there are complications e.g. Hypertensive encephalopathy*
- aspirin 300mg orally or rectally should be given as soon as possible if a haemorrhagic stroke has been excluded
- with regards to atrial fibrillation, the RCP state: 'anticoagulants should not be started until brain imaging has excluded haemorrhage, and usually not until 14 days have passed from the onset of an ischaemic stroke'
- if the cholesterol is > 3.5 mmol/l patients should be commenced on a statin. Many physicians will delay treatment until after at least 48 hours due to the risk of haemorrhagic transformation

Thrombolysis

Thrombolysis should only be given if:

- it is administered within 4.5 hours of onset of stroke symptoms (unless as part of a clinical trial)
- haemorrhage has been definitively excluded (i.e. Imaging has been performed)

Alteplase is currently recommended by NICE.

Contraindications to thrombolysis:

Absolute	Relative
<ul style="list-style-type: none">- Previous intracranial haemorrhage- Seizure at onset of stroke- Intracranial neoplasm- Suspected subarachnoid haemorrhage- Stroke or traumatic brain injury in preceding 3 months	<ul style="list-style-type: none">- Concurrent anticoagulation (INR >1.7)- Haemorrhagic diathesis- Active diabetic haemorrhagic retinopathy- Suspected intracardiac thrombus- Major surgery / trauma in preceding 2 weeks

Absolute	Relative
<ul style="list-style-type: none"> - Lumbar puncture in preceding 7 days - Gastrointestinal haemorrhage in preceding 3 weeks - Active bleeding - Pregnancy - Oesophageal varices - Uncontrolled hypertension >200/120mmHg 	

Secondary prevention

NICE also published a technology appraisal in 2010 on the use of clopidogrel and dipyridamole

Recommendations from NICE include:

- clopidogrel is now recommended by NICE ahead of combination use of aspirin plus modified release (MR) dipyridamole in people who have had an ischaemic stroke
- aspirin plus MR dipyridamole is now recommended after an ischaemic stroke only if clopidogrel is contraindicated or not tolerated, but treatment is no longer limited to 2 years' duration
- MR dipyridamole alone is recommended after an ischaemic stroke only if aspirin or clopidogrel are contraindicated or not tolerated, again with no limit on duration of treatment

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST** criteria or > 50% according to NASCET*** criteria

*the 2009 Controlling hypertension and hypotension immediately post-stroke (CHHIPS) trial may change thinking on this but guidelines have yet to change to reflect this

**European Carotid Surgery Trialists' Collaborative Group

***North American Symptomatic Carotid Endarterectomy Trial



A 41-year-old man presents to his GP with a two week history of headaches around the left side of his face associated with watery eyes. He describes having about two episodes a day each lasting around 30 minutes. What is the likely diagnosis?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Migraine |
| <input checked="" type="radio"/> | B. Cluster headache |
| <input type="radio"/> | C. Trigeminal neuralgia |
| <input type="radio"/> | D. Acute angle closure glaucoma |
| <input type="radio"/> | E. Meningioma |



Next question

Episodic eye pain, lacrimation, nasal stuffiness occurring daily - cluster headache

Cluster headache

Cluster headaches* are more common in men (5:1) and smokers.

Features

- pain typical occurs once or twice a day, each episode lasting 15 mins - 2 hours
- clusters typically last 4-12 weeks
- intense pain around one eye (recurrent attacks 'always' affect same side)
- patient is restless during an attack
- accompanied by redness, lacrimation, lid swelling
- nasal stuffiness
- miosis and ptosis in a minority

Management

- acute: 100% oxygen, subcutaneous or a nasal triptan
- prophylaxis: verapamil, prednisolone

- NICE recommend seeking specialist advice from a neurologist if a patient develops cluster headaches with respect to neuroimaging

*some neurologists use the term trigeminal autonomic cephalgia to group a number of conditions including cluster headache, paroxysmal hemicrania and short-lived unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT). It is recommended such patients are referred for specialist assessment as specific treatment may be required, for example it is known paroxysmal hemicrania responds very well to indomethacin



Question 10 of 128

Next

A 65-year-old woman presents with new, ongoing speech disturbance. She is worried that she may have had a stroke. Which one of the following scoring systems is it most appropriate to use to evaluate whether she has had a stroke?

<input type="radio"/>	A. CHADS2 score
<input type="radio"/>	B. ABCD2 score
<input type="radio"/>	C. RCP-RSE score
<input checked="" type="radio"/>	D. ROSIER score
<input type="radio"/>	E. CHADS2-VASC score

Next question

Stroke: assessment

Whilst the diagnosis of stroke may sometimes be obvious in many cases the presenting symptoms may be vague and accurate assessment difficult.

The FAST screening tool (Face/Arms/Speech/Time) is widely known by the general public following a publicity campaign. It has a positive predictive value of 78%.

A variant of FAST called the ROSIER score is useful for medical professionals. It is validated tool recommended by the Royal College of Physicians.

ROSIER score

Exclude hypoglycaemia first, then assess the following:

Assessment	Scoring
Loss of consciousness or syncope	- 1 point
Seizure activity	- 1 point
New, acute onset of:	
• asymmetric facial weakness	+ 1 point
• asymmetric arm weakness	+ 1 point
• asymmetric leg weakness	+ 1 point
• speech disturbance	+ 1 point
• visual field defect	+ 1 point

A stroke is likely if > 0



Question 11 of 128

Next

A 64-year-old man with a history of Parkinson's disease is reviewed in clinic and a decision has been made to start him on cabergoline. Which one of the following adverse effects is most strongly associated with this drug?



- ☐ A. Optic neuritis
- ☐ B. Transient rise in liver function tests
- ☒ C. Pulmonary fibrosis
- ☐ D. Renal failure
- ☐ E. Thrombocytopenia

Parkinson's disease: management

Currently accepted practice in the management of patients with Parkinson's disease (PD) is to delay treatment until the onset of disabling symptoms and then to introduce a dopamine receptor agonist. If the patient is elderly, levodopa is sometimes used as an initial treatment.

Dopamine receptor agonists

- e.g. Bromocriptine, ropinirole, cabergoline, apomorphine
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide*) have been associated with pulmonary, retroperitoneal and cardiac fibrosis. The Committee on Safety of Medicines advice that an echocardiogram, ESR, creatinine and chest x-ray should be obtained prior to treatment and patients should be closely monitored
- patients should be warned about the potential for dopamine receptor agonists to cause impulse control disorders and excessive daytime somnolence
- more likely than levodopa to cause hallucinations in older patients. Nasal congestion and postural hypotension are also seen in some patients

Levodopa

- usually combined with a decarboxylase inhibitor (e.g. carbidopa or benserazide) to prevent peripheral metabolism of levodopa to dopamine
- reduced effectiveness with time (usually by 2 years)
- unwanted effects: dyskinesia (involuntary writhing movements), 'on-off' effect, dry mouth, anorexia, palpitations, postural hypotension, psychosis, drowsiness
- no use in neuroleptic induced parkinsonism

MAO-B (Monoamine Oxidase-B) inhibitors

- e.g. Selegiline
- inhibits the breakdown of dopamine secreted by the dopaminergic neurons

Amantadine

- mechanism is not fully understood, probably increases dopamine release and inhibits its uptake at dopaminergic synapses
- side-effects include ataxia, slurred speech, confusion, dizziness and livedo reticularis

COMT (Catechol-O-Methyl Transferase) inhibitors

- e.g. Entacapone, tolcapone
- COMT is an enzyme involved in the breakdown of dopamine, and hence may be used as an adjunct to levodopa therapy
- used in conjunction with levodopa in patients with established PD

Antimuscarinics

- block cholinergic receptors
- now used more to treat drug-induced parkinsonism rather than idiopathic Parkinson's disease
- help tremor and rigidity
- e.g. procyclidine, benzotropine, trihexyphenidyl (benzhexol)

*pergolide was withdrawn from the US market in March 2007 due to concern regarding increased incidence of valvular dysfunction

1 / 3 **Question 12-14 of 128**

Next

Theme: Epilepsy: treatment

A.	Clonazepam
B.	Ethosuximide
C.	Levetiracetam
D.	Sodium valproate
E.	Phenytoin
F.	Lamotrigine
G.	Gabapentin
H.	Carbamazepine

For each one of the following select the most appropriate medication from the list above:

12. A 24-year-old man with complex partial seizures

 You answered Phenytoin

The correct answer is Carbamazepine


13. First-line anti-epileptic in a 17-year-old girl with tonic-clonic seizures. She has the Depo-Provera injection for contraception.

 You answered Phenytoin

The correct answer is Sodium valproate

If there was a high-risk of pregnancy (for example just using condoms for contraception) lamotrigine may be a more suitable choice.

14. Useful in patients with absence seizures who are intolerant of sodium valproate

 Ethosuximide

[Next question](#)

Epilepsy: treatment

Most neurologists now start antiepileptics following a second epileptic seizure. NICE guidelines suggest starting antiepileptics after the first seizure if any of the following are present:

- the patient has a neurological deficit
- brain imaging shows a structural abnormality
- the EEG shows unequivocal epileptic activity
- the patient or their family or carers consider the risk of having a further seizure unacceptable

Sodium valproate is considered the first line treatment for patients with generalised seizures with

carbamazepine used for partial seizures

Generalised tonic-clonic seizures

- sodium valproate
- second line: lamotrigine, carbamazepine

Absence seizures* (Petit mal)

- sodium valproate or ethosuximide
- sodium valproate particularly effective if co-existent tonic-clonic seizures in primary generalised epilepsy

Myoclonic seizures

- sodium valproate
- second line: clonazepam, lamotrigine

Partial seizures

- carbamazepine
- second line: lamotrigine**, sodium valproate

*carbamazepine may actually exacerbate absence seizure

**the 2007 SANAD study indicated that lamotrigine may be a more suitable first-line drug for partial seizures although this has yet to work its way through to guidelines



Question 15 of 128

Next

A 34-year-old female with a history of primary generalised epilepsy presents to her GP as she plans to start a family. She currently takes sodium valproate as monotherapy. What advice should be given regarding the prevention of neural tube defects?



A. Folic acid 400 mcg per day once pregnancy has been confirmed

- | | |
|------------------------------------|--|
| <input type="radio"/> | B. Folic acid 1 mg per day once pregnancy has been confirmed |
| ✓ <input checked="" type="radio"/> | C. Folic acid 5 mg per day starting now |
| <input type="radio"/> | D. Folic acid 10 mg per day starting now |
| <input type="radio"/> | E. Folic acid 400 mcg per day starting now |

Next question

Epilepsy + pregnancy = 5mg folic acid

Epilepsy: pregnancy and breast feeding

The risks of uncontrolled epilepsy during pregnancy generally outweigh the risks of medication to the fetus. All women thinking about becoming pregnant should be advised to take folic acid 5mg per day well before pregnancy to minimise the risk of neural tube defects. Around 1-2% of newborns born to non-epileptic mothers have congenital defects. This rises to 3-4% if the mother takes antiepileptic medication.

Other points

- aim for monotherapy
- there is no indication to monitor antiepileptic drug levels
- sodium valproate: associated with neural tube defects
- carbamazepine: often considered the least teratogenic of the older antiepileptics
- phenytoin: associated with cleft palate
- lamotrigine: studies to date suggest the rate of congenital malformations may be low. The dose of lamotrigine may need to be increased in pregnancy

Breast feeding is generally considered safe for mothers taking antiepileptics with the possible exception of the barbiturates

It is advised that pregnant women taking phenytoin are given vitamin K in the last month of pregnancy to prevent clotting disorders in the newborn

Sodium valproate

The November 2013 issue of the Drug Safety Update also carried a warning about new evidence showing a significant risk of neurodevelopmental delay in children following maternal use of sodium valproate.

The update concludes that sodium valproate should not be used during pregnancy and in women of childbearing age unless clearly necessary. Women of childbearing age should not start treatment without specialist neurological or psychiatric advice.



Question 16 of 128

Next

A 24-year-old female presents to her GP due to increased frequency of migraine attacks. She is now having around four migraines per month. Which type of medication would it be most appropriate to prescribe to reduce the frequency of migraine attacks?



- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Specific 5-HT ₂ agonist |
| <input type="radio"/> | B. 5-HT ₁ antagonist |
| <input type="radio"/> | C. Tricyclic antidepressant |
| <input checked="" type="radio"/> | D. Beta-blocker |
| <input type="radio"/> | E. Specific 5-HT ₁ agonist |

Next question

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Topiramate is also recommended by NICE as first-line prophylaxis against migraine. However, given that she is female and of child-bearing age a beta-blocker (such as propranolol) is a better choice.

The October 2009 AKT feedback report highlighted the pharmacological management of headache as an area causing difficulty for Candidates.

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 17 of 128

Next

A 35-year-old woman presents with a variety of symptoms including generalised skin tingling and headache. She is concerned she may have multiple sclerosis. What is the most common presentation of multiple sclerosis?



- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Tremor |
| <input type="radio"/> | B. Urinary incontinence |
| <input checked="" type="radio"/> | C. Optic neuritis |
| <input type="radio"/> | D. Motor neuropathy |
| <input type="radio"/> | E. Internuclear ophthalmoplegia |

Next question

Multiple sclerosis: features

Patient's with multiple sclerosis (MS) may present with non-specific features, for example around 75% of patients have significant lethargy.

Visual

- optic neuritis: common presenting feature
- optic atrophy
- Uhthoff's phenomenon: worsening of vision following rise in body temperature
- internuclear ophthalmoplegia

Sensory

- pins/needles
- numbness
- trigeminal neuralgia
- Lhermitte's syndrome: paraesthesiae in limbs on neck flexion

Motor

- spastic weakness: most commonly seen in the legs

Cerebellar

- ataxia: more often seen during an acute relapse than as a presenting symptom
- tremor

Others

- urinary incontinence
- sexual dysfunction
- intellectual deterioration



Question 18 of 128

Next

A 56-year-old woman comes for review. Around 4 weeks ago she had a blistering rash under her right breast which extended around to the back. A diagnosis of shingles was made. Unfortunately since that time she has been experiencing severe 'shooting' pains. The skin is also very tender to touch. Neither paracetamol nor ibuprofen have helped her symptoms. What is the most appropriate next step in management?



<input type="radio"/>	A. Lidocaine patch
<input type="radio"/>	B. Tramadol
<input checked="" type="radio"/>	C. Amitriptyline
<input type="radio"/>	D. Carbamazepine
<input type="radio"/>	E. Diclofenac

Next question

This lady has developed post-herpetic neuralgia. NICE recommend using amitriptyline, duloxetine, gabapentin or pregabalin first-line.

Neuropathic pain

Neuropathic pain may be defined as pain which arises following damage or disruption of the nervous system. It is often difficult to treat and responds poorly to standard analgesia.

Examples include:

- diabetic neuropathy
- post-herpetic neuralgia
- trigeminal neuralgia
- prolapsed intervertebral disc

NICE updated their guidance on the management of neuropathic pain in 2013:

- first-line treatment*: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

*please note that for some specific conditions the guidance may vary. For example carbamazepine is used first-line for trigeminal neuralgia



Question 19 of 128

Next

A 34-year-old man with a history of migraine and asthma presents with due to increasing problems with migraine. He is now having one disabling migraine attack every two weeks. These attacks typically last around 24 hours and are only partially responsive to zolmitriptan. As a result he is often absent from work. His current medication includes zolmitriptan, salbutamol and Clenil.

What is the most appropriate medication to prescribe to reduce the frequency of his migraine attacks?

	<input type="radio"/>	A. Lamotrigine
	<input type="radio"/>	B. Amitriptyline
	<input type="radio"/>	C. Pizotifen
	<input checked="" type="radio"/>	D. Topiramate
	<input type="radio"/>	E. Sumatriptan

Next question

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

NICE recommend either propranolol or topiramate as migraine prophylaxis. Propranolol should be avoided in this patient as he is asthmatic.

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.

- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop

1 / 3 **Question 20-22 of 128**

Next

Theme: Causes of headache

A.	Temporal arteritis
B.	Sinusitis
C.	Tension headache
D.	Cluster headache
E.	Acute glaucoma
F.	Migraine
G.	Subarachnoid haemorrhage
H.	Raised intracranial pressure
I.	Medication overuse headache
J.	Meningitis

For each one of the following clinical scenarios select the most likely diagnosis:

20. A 62-year-old woman presents with a one day history of pain around her right eye. She feels nauseous and has vomited once. On examination her right eye is red

✓ Acute glaucoma

21. A 42-year-old man presents with pain in the posterior and left side of his head. This came on over one minute and is now severe. The pain is worse when he bends his neck. His temperature is 37.3°C

✗ You answered Temporal arteritis

The correct answer is Subarachnoid haemorrhage

22. A 22-year-old woman presents with recurrent headaches around the time of her periods. These are typically on the left-side and severe. When she gets a headache it lasts several hours and she usually goes to bed.

✗ You answered Tension headache

The correct answer is Migraine

[Next question](#)

Headache

Headache accounts for a large proportion of medical consultations. The table below summarises the main characteristics of common or important causes:

Migraine	Recurrent, severe headache which is usually unilateral and throbbing in nature May be associated with aura, nausea and photosensitivity Aggravated by, or causes avoidance of, routine activities of daily living. Patients often describe 'going to bed'. In women may be associated with menstruation
Tension headache	Recurrent, non-disabling, bilateral headache, often described as a 'tight-band' Not aggravated by routine activities of daily living

Cluster headache*	<p>Pain typical occurs once or twice a day, each episode lasting 15 mins - 2 hours with clusters typically lasting 4-12 weeks</p> <p>Intense pain around one eye (recurrent attacks 'always' affect same side)</p> <p>Patient is restless during an attack</p> <p>Accompanied by redness, lacrimation, lid swelling</p> <p>More common in men and smokers</p>
Temporal arteritis	<p>Typically patient > 60 years old</p> <p>Usually rapid onset (e.g. < 1 month) of unilateral headache</p> <p>Jaw claudication (65%)</p> <p>Tender, palpable temporal artery</p> <p>Raised ESR</p>
Medication overuse headache	<p>Present for 15 days or more per month</p> <p>Developed or worsened whilst taking regular symptomatic medication</p> <p>Patients using opioids and triptans are at most risk</p> <p>May be psychiatric co-morbidity</p>

Other causes of headache

Acute single episode

- meningitis
- encephalitis
- subarachnoid haemorrhage
- head injury
- sinusitis
- glaucoma (acute closed-angle)
- tropical illness e.g. Malaria

Chronic headache

- chronically raised ICP
- Paget's disease
- psychological

*some neurologists use the term trigeminal autonomic cephalgia to group a number of conditions including cluster headache, paroxysmal hemicrania and short-lived unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT). It is recommended such patients are referred for

specialist assessment as specific treatment may be required, for example it is known paroxysmal hemicrania responds very well to indomethacin



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Next

You prescribe sumatriptan to a patient who suffers from migraines. Which one of the following side-effects is most commonly associated with this drug?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Dystonic reactions such as oculogyric crisis |
| <input type="radio"/> | B. Heartburn |
| <input checked="" type="radio"/> | C. Tightness of the throat and chest |
| <input type="radio"/> | D. Constipation |
| <input type="radio"/> | E. Insomnia |

Next question

Triptans

Triptans are specific 5-HT₁ agonists used in the acute treatment of migraine. They are generally used first-line in combination therapy with an NSAID or paracetamol.

Prescribing points

- should be taken as soon as possible after the onset of headache, rather than at onset of aura
- oral, orodispersible, nasal spray and subcutaneous injections are available

Adverse effects

- 'triptan sensations' - tingling, heat, tightness (e.g. throat and chest), heaviness, pressure

Contraindications

- patients with a history of, or significant risk factors for, ischaemic heart disease or cerebrovascular disease



Question 24 of 128

Next

A 23-year-old presents for review. For the past 3 months or so he has been having problems with frequent headaches. These are now occurring on an almost daily basis and can be severe at times. Which one of the following features should prompt investigation for a secondary cause of headaches?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Photophobia during the headache |
| <input type="radio"/> | B. Feeling of nausea during the headache |
| <input type="radio"/> | C. Severe unilateral eye pain |
| <input checked="" type="radio"/> | D. Headache worsens on coughing |
| <input type="radio"/> | E. Numbness lasting 30 minutes before the headache |

Next question

Headache: red flags

Headache is one of the most common presenting complaints seen in clinical practice. The vast majority of these will be caused by common, benign conditions. There are however certain features in a history which should prompt further action. In the 2012 guidelines NICE suggest the following:

- compromised immunity, caused, for example, by HIV or immunosuppressive drugs
- age under 20 years and a history of malignancy
- a history of malignancy known to metastasise to the brain
- vomiting without other obvious cause
- worsening headache with fever

- sudden-onset headache reaching maximum intensity within 5 minutes
- new-onset neurological deficit
- new-onset cognitive dysfunction
- change in personality
- impaired level of consciousness
- recent (typically within the past 3 months) head trauma
- headache triggered by cough, valsalva (trying to breathe out with nose and mouth blocked), sneeze or exercise
- orthostatic headache (headache that changes with posture)
- symptoms suggestive of giant cell arteritis or acute narrow-angle glaucoma
- a substantial change in the characteristics of their headache



Question 25 of 128

Next

A 34-year-old female presents to her GP due to a number of 'funny-dos'. She describes a sensation that her surroundings are unreal, 'like a dream'. Following this she has been told that she starts to smack her lips, although she has no recollection of doing this. What is the most likely diagnosis?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Myoclonic seizure |
| <input type="radio"/> | B. Simple partial seizure |
| <input checked="" type="radio"/> | C. Complex partial seizure |
| <input type="radio"/> | D. Partial seizure progressing to generalised seizure |
| <input type="radio"/> | E. Absence seizure |

Next question

With simple partial seizures there is no disturbance of consciousness or awareness. Lip smacking is an example of an automatism - an automatic, repetitive act

Epilepsy: classification

Basics

- two main categories are generalised and partial seizures

- partial seizures may progress to general seizures
- other types: myoclonic, atypical absence, atonic and tonic seizures are usually seen in childhood

Generalised - no focal features, consciousness lost immediately

- grand mal (tonic-clonic)
- petit mal (absence seizures)
- myoclonic: brief, rapid muscle jerks
- partial seizures progressing to generalised seizures

Partial - focal features depending on location

- simple (no disturbance of consciousness or awareness)
- complex (consciousness is disturbed)
- temporal lobe → aura, déjà vu, jamais vu; motor → Jacksonian



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Next

A 64-year-old man presents with a eight-month history of generalised weakness. On examination he has fasciculation and weakness in both arms with absent reflexes. Examination of the lower limbs reveal increased tone and exaggerated reflexes. Sensation was normal and there were no cerebellar signs. What is the most likely diagnosis?



<input type="radio"/>	A. Lead poisoning
<input checked="" type="radio"/>	B. Motor neuron disease
<input type="radio"/>	C. Vitamin B12 deficiency
<input checked="" type="radio"/>	D. Syringomyelia
<input type="radio"/>	E. Multiple sclerosis

'Fasciculations' - think motor neuron disease

These symptoms are typical of amyotrophic lateral sclerosis, the most common type of motor neuron disease.

Motor neuron disease: features

Motor neuron disease is a neurological condition of unknown cause which can present with both upper and lower motor neuron signs. It rarely presents before 40 years and various patterns of disease are recognised including amyotrophic lateral sclerosis, progressive muscular atrophy and bulbar palsy

There are a number of clues which point towards a diagnosis of motor neuron disease:

- fasciculation
- absence of sensory signs/symptoms*
- lower motor neuron signs in arms and upper motor neuron signs in legs
- wasting of the small hand muscles/tibialis anterior is common

Other features

- doesn't affect external ocular muscles
- no cerebellar signs
- abdominal reflexes are usually preserved and sphincter dysfunction if present is a late feature

The diagnosis of motor neuron disease is clinical, but nerve conduction studies will show normal motor conduction and can help exclude a neuropathy. Electromyography shows a reduced number of action potentials with an increased amplitude. MRI is usually performed to exclude the differential diagnosis of cervical cord compression and myelopathy

*vague sensory symptoms may occur early in the disease (e.g. limb pain) but 'never' sensory signs



Question 27 of 128

Next

A 29-year-old woman with a past history of hypothyroidism presents to the surgery complaining of weakness, particularly of her arms, for the past four months. She has also developed double vision towards the end of the day, despite having a recent normal examination at the opticians. What is the most likely diagnosis?

- | | |
|----------------------------------|-------------------------------------|
| <input type="radio"/> | A. LambertEaton myasthenic syndrome |
| <input type="radio"/> | B. Polymyositis |
| <input checked="" type="radio"/> | C. Polymyalgia rheumatica |
| <input type="radio"/> | D. Multiple sclerosis |
| <input checked="" type="radio"/> | E. Myasthenia gravis |

Next question

Myasthenia gravis

Myasthenia gravis is an autoimmune disorder resulting in insufficient functioning acetylcholine receptors. Antibodies to acetylcholine receptors are seen in 85-90% of cases*. Myasthenia is more common in women (2:1)

The key feature is muscle fatigability - muscles become progressively weaker during periods of activity and slowly improve after periods of rest:

- extraocular muscle weakness: diplopia
- proximal muscle weakness: face, neck, limb girdle
- ptosis
- dysphagia

Associations

- thymomas in 15%
- autoimmune disorders: pernicious anaemia, autoimmune thyroid disorders, rheumatoid, SLE
- thymic hyperplasia in 50-70%

Investigations

- single fibre electromyography: high sensitivity (92-100%)
- CT thorax to exclude thymoma
- CK normal
- autoantibodies: around 85-90% of patients have antibodies to acetylcholine receptors. In the remaining patients, about about 40% are positive for anti-muscle-specific tyrosine kinase antibodies
- Tensilon test: IV edrophonium reduces muscle weakness temporarily - not commonly used anymore due to the risk of cardiac arrhythmia

Management

- long-acting anticholinesterase e.g. pyridostigmine
- immunosuppression: prednisolone initially
- thymectomy

Management of myasthenic crisis

- plasmapheresis
- intravenous immunoglobulins

*antibodies are less commonly seen in disease limited to the ocular muscles



Question 28 of 128

Next

A 55-year-old woman complains of neck and right arm pain for the past two months. The pain is often triggered by flexing her neck. Her past medical history includes osteoarthritis of her knee, obesity and depression. On examination there is no obvious muscle atrophy or weakness of the right arm. There is however some sensory loss over the middle finger and palm of the hand. Which nerve root is most likely to be affected by the impingement?



A. C4



B. C5



C. C6



D. C7



E. C8

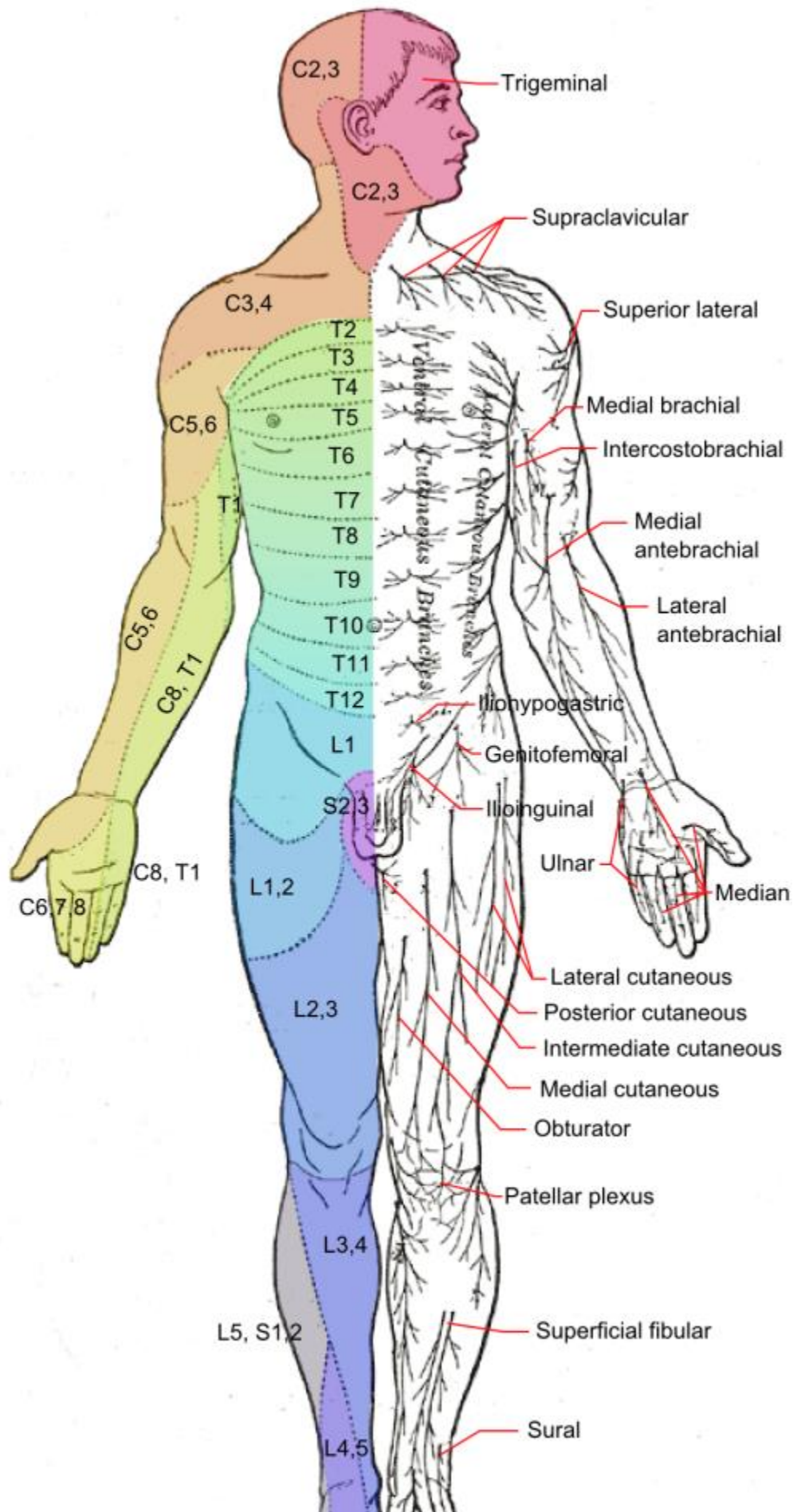
[Next question](#)

Dermatomes

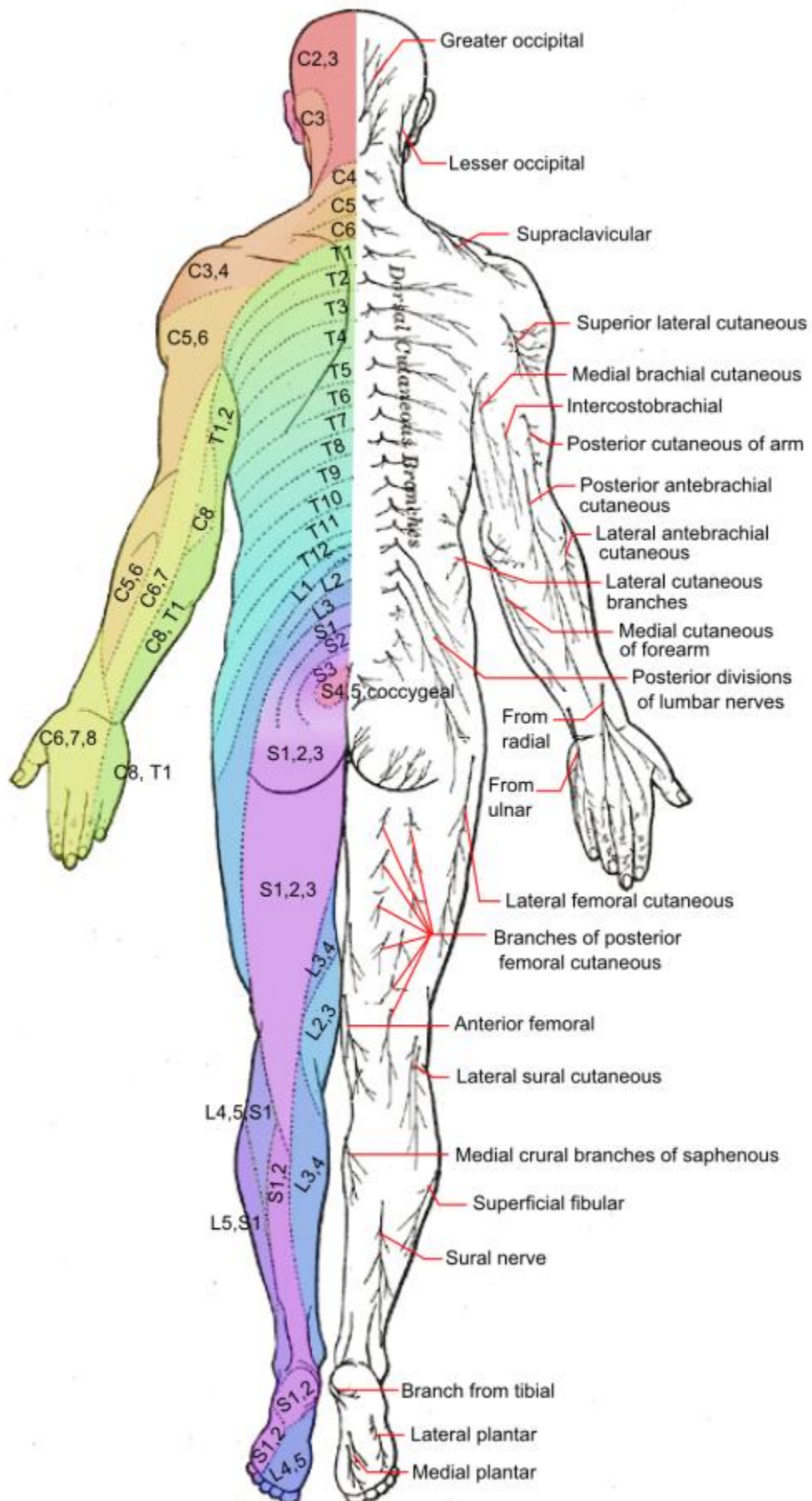
The table below lists the major dermatome landmarks:

Nerve root	Landmark	Mnemonics
C2	Posterior half of the skull (cap)	
C3	High turtleneck shirt	
C4	Low-collar shirt	
C5, C6	Thumb + index finger	Make a 6 with your left hand by touching the tip of the thumb & index finger together - C6
C7	Middle finger + palm of hand	
C8	Ring + little finger	
T4	Nipples	T4 at the Teat Pore
T5	Inframammary fold	
T7	Xiphoid process	
T10	Umbilicus	BellybuT-TEN
L1	Inguinal ligament	L for ligament, 1 for Inguinal

L4	Knee caps	Down on aLL fours - L4
L5	Big toe, dorsum of foot (except lateral aspect)	L5 = Largest of the 5 toes
S1	Lateral foot, small toe	S1 = the smallest one
S2, S3	Genitalia	









Question 29 of 128

Next

Which one of the following statements regarding migraine is true?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. The prevalence in men is around 3% |
| <input checked="" type="radio"/> | B. It is 3 times more common in women |
| <input type="radio"/> | C. The progestogen only pill is a common trigger for migraine |
| <input type="radio"/> | D. Cooked spinach is a common trigger for migraine |
| <input type="radio"/> | E. Around 60% of patients experience a visual aura prior to an attack |

Next question

Migraine

Migraine is a common type of primary headache. It is characterised typically by:

- a severe, unilateral, throbbing headache
- associated with nausea, photophobia and phonophobia
- attacks may last up to 72 hours
- patients characteristically go to a darkened, quiet room during an attack
- 'classic' migraine attacks are precipitated by an aura. These occur in around one-third of migraine patients
- typical aura are visual, progressive, last 5-60 minutes and are characterised by transient hemianopic disturbance or a spreading scintillating scotoma
- formal diagnostic criteria are produced by the International Headache Society (see below)

Epidemiology

- 3 times more common in women

- prevalence in men is around 6%, in women 18%

Common triggers for a migraine attack

- tiredness, stress
- alcohol
- combined oral contraceptive pill
- lack of food or dehydration
- cheese, chocolate, red wines, citrus fruits
- menstruation
- bright lights

Migraine diagnostic criteria

A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none"> • 1. unilateral location* • 2. pulsating quality (i.e., varying with the heartbeat) • 3. moderate or severe pain intensity • 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none"> • 1. nausea and/or vomiting* • 2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.



Question 30 of 128

Next

A 16-year-old boy is reviewed. For the past 18 months he has been experiencing unilateral, throbbing headaches associated with photophobia. These typically occur once every two weeks or so and last a few hours. He has a strong family history of migraine. Until now he has used paracetamol with limited effect. Which one of the following would NICE recommend as the most suitable treatment for an acute attack?



A. Aspirin



B. Nasal triptan + paracetamol



C. Oral triptan + ibuprofen



D. Ibuprofen



E. Co-codamol

Next question

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 31 of 128

Next

A 69-year-old man who is known to have Alzheimer's disease is reviewed in clinic. His latest Mini Mental State Examination (MMSE) score is 18 out of 30. According to NICE guidelines, what further action should be taken?



<input type="radio"/>	A. Supportive care + memantine
<input type="radio"/>	B. Supportive care + trial of citalopram
<input type="radio"/>	C. Continue supportive care
<input type="radio"/>	D. Supportive care + donepezil + low-dose aspirin
<input checked="" type="radio"/>	E. Supportive care + donepezil



Next question

Alzheimer's disease

Alzheimer's disease is a progressive degenerative disease of the brain accounting for the majority of dementia seen in the UK

Genetics

- most cases are sporadic
- 5% of cases are inherited as an autosomal dominant trait
- mutations in the amyloid precursor protein (chromosome 21), presenilin 1 (chromosome 14) and presenilin 2 (chromosome 1) genes are thought to cause the inherited form
- apolipoprotein E allele E4 - encodes a cholesterol transport protein

Pathological changes

- macroscopic: widespread cerebral atrophy, particularly involving the cortex and hippocampus
- microscopic: cortical plaques due to deposition of type A-Beta-amyloid protein and intraneuronal neurofibrillary tangles caused by abnormal aggregation of the tau protein
- biochemical: there is a deficit of acetylcholine from damage to an ascending forebrain projection

Neurofibrillary tangles

- paired helical filaments are partly made from a protein called tau
- in AD tau proteins are excessively phosphorylated

Management

- NICE now recommend the three acetylcholinesterase inhibitors (donepezil, galantamine and rivastigmine) as options for managing mild to moderate Alzheimer's disease
- memantine (a NMDA receptor antagonist) is reserved for patients with moderate - severe Alzheimer's



Question 32 of 128

Next

A 54-year-old man with a history of epilepsy and ischaemic heart disease is seen in clinic with a 3 month history of lethargy. Blood tests are as follows:

Hb	9.6 g/dl
MCV	123 fl
Plt	$164 \times 10^9/l$
WCC	$4.6 \times 10^9/l$

Which one of his medications is most likely to be responsible?



- | | |
|----------------------------------|------------------|
| <input type="radio"/> | A. Clopidogrel |
| <input type="radio"/> | B. Atorvastatin |
| <input type="radio"/> | C. Carbamazepine |
| <input type="radio"/> | D. Atenolol |
| <input checked="" type="radio"/> | E. Phenytoin |

Next question

Phenytoin may cause a megaloblastic anaemia by altering folate metabolism

Phenytoin

Phenytoin is used to in the management of seizures.

Mechanism of action

- sodium channel blocker, decreasing the sodium influx into neurons which in turn decreases excitability

Phenytoin is associated with a large number of adverse effects. These may be divided into acute, chronic, idiosyncratic and teratogenic

Acute

- initially: dizziness, diplopia, nystagmus, slurred speech, ataxia
- later: confusion, seizures

Chronic

- common: gingival hyperplasia (secondary to increased expression of platelet derived growth factor, PDGF), hirsutism, coarsening of facial features, drowsiness
- megaloblastic anaemia (secondary to altered folate metabolism)
- peripheral neuropathy
- enhanced vitamin D metabolism causing osteomalacia
- lymphadenopathy
- dyskinesia

Idiosyncratic

- fever
- rashes, including severe reactions such as toxic epidermal necrolysis
- hepatitis
- Dupuytren's contracture*
- aplastic anaemia
- drug-induced lupus

Teratogenic

- associated with cleft palate and congenital heart disease

*although not listed in the BNF



Question 33 of 128

Next

A diabetic man is diagnosed as having painful diabetic neuropathy in his feet. He has no other medical history of note. What is the most suitable first-line treatment to relieve his pain?



A. Duloxetine



B. Sodium valproate



C. Carbamazepine



D. Referral to pain management clinic



E. Tramadol

[Next question](#)

Diabetic neuropathy

NICE updated its guidance on the management of neuropathic pain in 2013. Diabetic neuropathy is now managed in the same way as other forms of neuropathic pain:

- first-line treatment: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

Gastroparesis

- symptoms include erratic blood glucose control, bloating and vomiting
- management options include metoclopramide, domperidone or erythromycin (prokinetic agents)



Question 34 of 128

[Next](#)

You are reviewing a 22-year-old man who has developed headaches. Which one of the following features is most typical of migraines?

	<input type="radio"/>	A. Pain on neck flexion
	<input checked="" type="radio"/>	B. Phonophobia
	<input type="radio"/>	C. Epiphora
	<input type="radio"/>	D. Recent viral illness
	<input type="radio"/>	E. Bilateral, 'tight-band' like pain

Next question

Phonophobia occurs in around three-quarters of patients.

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none"> 1. unilateral location* 2. pulsating quality (i.e., varying with the heartbeat) 3. moderate or severe pain intensity 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none"> 1. nausea and/or vomiting* 2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral
- NICE also give more detail about typical auras:

Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance
- decreased level of consciousness.



Question 35 of 128

Next

You want to prescribe an antiemetic to a 19-year-old female who is having a migraine attack. Which one of the following medications is most likely to precipitate extrapyramidal side-effects?



A. Meptazinol

	<input type="radio"/>	B. Ondansetron
	<input type="radio"/>	C. Domperidone
	<input type="radio"/>	D. Cyclizine
	<input checked="" type="radio"/>	E. Metoclopramide

Next question

Extrapyramidal side-effects are particularly common in children and young adults.

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'

- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 36 of 128

Next

A 23-year-old man with difficult to control epilepsy is reviewed in surgery, four months after a change in his antiepileptic medication. He has remained seizure free but has gained 5 kg in weight since last reviewed. Which one of the following antiepileptic drugs is most associated with weight gain?

- | | |
|----------------------------------|---------------------|
| <input type="radio"/> | A. Ethosuximide |
| <input checked="" type="radio"/> | B. Sodium valproate |
| <input type="radio"/> | C. Levetiracetam |
| <input type="radio"/> | D. Carbamazepine |
| <input checked="" type="radio"/> | E. Lamotrigine |

Next question

Sodium valproate

Sodium valproate is used in the management of epilepsy and is first line therapy for generalised seizures. It works by increasing GABA activity.

Adverse effects

- gastrointestinal: nausea
- increased appetite and weight gain

- alopecia: regrowth may be curly
- ataxia
- tremor
- hepatitis
- pancreatitis
- thrombocytopaenia
- teratogenic
- hyponatraemia



Question 37 of 128

Next

You review a 31-year-old woman who is suffering from frequent tension-type headaches. Her headaches partially respond to paracetamol and ibuprofen but she asks if there is any treatment to stop the headaches coming in the first place. What is the most appropriate action?



- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Trial of citalopram |
| <input type="radio"/> | B. Trial of propranolol |
| <input type="radio"/> | C. Issue an exercise prescription |
| <input type="radio"/> | D. Trial of amitriptyline |
| <input checked="" type="radio"/> | E. Refer for acupuncture |



Next question

Tension-type headache

Tension-type headache is form of episodic primary headache.

Characteristic features

- often described as a 'tight band' around the head or a pressure sensation. Symptoms tend to be bilateral, where as migraine is typically unilateral
- tends to be of a lower intensity than migraine

- not associated with aura, nausea/vomiting or aggravated by routine physical activity
- may be related to stress
- may co-exist with migraine

Chronic tension-type headache is defined as a tension headache occur on 15 or more days per month.

NICE produced guidelines on the management of tension-type headache in 2012:

- acute treatment: aspirin, paracetamol or an NSAID are first-line
- prophylaxis: NICE recommend 'up to 10 sessions of acupuncture over 5-8 weeks'
- low-dose amitriptyline is widely used in the UK for prophylaxis against tension-type headache. The 2012 NICE guidelines do not however support this approach '*...there was not enough evidence to recommend pharmacological prophylactic treatment for tension type headaches. The GDG considered that pure tension type headache requiring prophylaxis is rare. Assessment is likely to uncover coexisting migraine symptomatology with a possible diagnosis of chronic migraine.*'



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Next

A 42-year-old woman presents as she has noticed a 'droop' in the right side of her face since she woke up this morning. There is no associated limb weakness, dysphagia or visual disturbance. On examination you notice right-sided upper and lower facial paralysis. Which one of the following features would be most consistent with a diagnosis of Bell's palsy?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Vesicular rash around the ear |
| <input checked="" type="radio"/> | B. Hyperacusis |
| <input type="radio"/> | C. Sensory loss over the distribution of the facial nerve |
| <input type="radio"/> | D. Pins and needles in the right arm |
| <input type="radio"/> | E. Rhinorrhoea |

Next question

A vesicular rash around the ear would suggest a diagnosis of Ramsey Hunt syndrome. Hyperacusis is seen in around a third of patients.

Bell's palsy

Bell's palsy may be defined as an acute, unilateral, idiopathic, facial nerve paralysis. The aetiology is unknown although the role of the herpes simplex virus has been investigated previously. The peak incidence is 20-40 years and the condition is more common in pregnant women.

Features

- lower motor neuron facial nerve palsy - forehead affected*
- patients may also notice post-auricular pain (may precede paralysis), altered taste, dry eyes, hyperacusis

Management

- in the past a variety of treatment options have been proposed including no treatment, prednisolone only and a combination of aciclovir and prednisolone
- following a National Institute for Health randomised controlled trial it is now recommended that prednisolone 1mg/kg for 10 days should be prescribed for patients within 72 hours of onset of Bell's palsy. Adding in aciclovir gives no additional benefit
- eye care is important - prescription of artificial tears and eye lubricants should be considered

Prognosis

- if untreated around 15% of patients have permanent moderate to severe weakness

*upper motor neuron lesion 'spares' upper face



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Next

A 45-year-old man presents with dizziness and right-sided hearing loss to his GP. Which one of the following tests would most likely indicate an acoustic neuroma?

- | | |
|----------------------------------|--------------------------------|
| <input type="radio"/> | A. Jerky nystagmus |
| <input type="radio"/> | B. Left homonymous hemianopia |
| <input checked="" type="radio"/> | C. Tongue deviated to the left |
| <input type="radio"/> | D. Fasciculation of the tongue |
| <input checked="" type="radio"/> | E. Absent corneal reflex |

Next question

Loss of corneal reflex - think acoustic neuroma

Acoustic neuroma

Acoustic neuromas (more correctly called vestibular schwannomas) account for approximately five percent of intracranial tumours and 90 percent of cerebellopontine angle

Features can be predicted by the affected cranial nerves

- cranial nerve VIII: hearing loss, vertigo, tinnitus
- cranial nerve V: absent corneal reflex
- cranial nerve VII: facial palsy

Bilateral acoustic neuromas are seen in neurofibromatosis type 2

MRI of the cerebellopontine angle is the investigation of choice



Question 40 of 128

Next

Which one of the following statements regarding the stopping of anti-epileptic drugs (AED) is most correct?

<input type="radio"/>	A.	Can be considered if seizure free for > 5 years, with AEDs being stopped over 2-3 months
✓ <input checked="" type="radio"/>	B.	Can be considered if seizure free for > 2 years, with AEDs being stopped over 2-3 months
<input type="radio"/>	C.	Can be considered if seizure free for > 1 year, with AEDs being stopped over 2-3 months
<input type="radio"/>	D.	Can be considered if seizure free for > 5 years, with AEDs being stopped over 8-12 months
<input type="radio"/>	E.	Can be considered if seizure free for > 1 year, with AEDs being stopped over 8-12 months

Next question

The above reflects 2004 NICE guidelines and should be done under the guidance of a specialist. Benzodiazepines should be withdrawn over a longer period.

Epilepsy: treatment

Most neurologists now start antiepileptics following a second epileptic seizure. NICE guidelines suggest starting antiepileptics after the first seizure if any of the following are present:

- the patient has a neurological deficit
- brain imaging shows a structural abnormality
- the EEG shows unequivocal epileptic activity
- the patient or their family or carers consider the risk of having a further seizure unacceptable

Sodium valproate is considered the first line treatment for patients with generalised seizures with carbamazepine used for partial seizures

Generalised tonic-clonic seizures

- sodium valproate
- second line: lamotrigine, carbamazepine

Absence seizures* (Petit mal)

- sodium valproate or ethosuximide

- sodium valproate particularly effective if co-existent tonic-clonic seizures in primary generalised epilepsy

Myoclonic seizures

- sodium valproate
- second line: clonazepam, lamotrigine

Partial seizures

- carbamazepine
- second line: lamotrigine**, sodium valproate

*carbamazepine may actually exacerbate absence seizure

**the 2007 SANAD study indicated that lamotrigine may be a more suitable first-line drug for partial seizures although this has yet to work its way through to guidelines



Question 41 of 128

Next

A 50-year-old man develops chronic, severe pain after sustaining a brachial plexus injury as a result of motorbike accident. He has had no benefit from paracetamol or ibuprofen. Following recent NICE guidelines, what is the most appropriate medication to consider?



<input type="radio"/>	A. Amitriptyline, gabapentin or sertraline
<input type="radio"/>	B. Gabapentin, duloxetine or topical lidocaine
<input type="radio"/>	C. Amitriptyline, carbamazepine or topical lidocaine
<input checked="" type="radio"/>	D. Amitriptyline, duloxetine, gabapentin or pregabalin
<input type="radio"/>	E. Duloxetine, pregabalin or buprenorphine

Next question

Neuropathic pain

Neuropathic pain may be defined as pain which arises following damage or disruption of the nervous system. It is often difficult to treat and responds poorly to standard analgesia.

Examples include:

- diabetic neuropathy
- post-herpetic neuralgia
- trigeminal neuralgia
- prolapsed intervertebral disc

NICE updated their guidance on the management of neuropathic pain in 2013:

- first-line treatment*: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

*please note that for some specific conditions the guidance may vary. For example carbamazepine is used first-line for trigeminal neuralgia



Question 42 of 128

Next

You review a 27-year-old woman who is complaining of frequent headaches. These are migranous in nature and only come on around the time of menstruation. She has tried propranolol prophylaxis previous but stopped this due to side-effects. Mefanamic acid and naproxen have also proved ineffective. Which one of the following preventative methods should be considered?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Zolmitriptan bd during menstruation |
| <input type="radio"/> | B. Combined oral contraceptive pill with no pill free interval |
| <input type="radio"/> | C. Rectal NSAIDs during menstruation |

☐ D. Norethisterone tds during menstruation

☐ E. Cognitive behavioural therapy

Next question

Triptans may be used as a 'mini-prophylaxis' against menstrual migraine

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'

- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 43 of 128

Next

A 23-year-old man presents to his GP. He describes episodes of leg weakness following bouts of laughing whilst out with friends. The following weekend his friends described a brief collapse following a similar episode. What is the most likely diagnosis?



<input type="radio"/>	A. Stokes-Adams attack
<input checked="" type="radio"/>	B. Cataplexy
<input type="radio"/>	C. Hypokalaemic periodic paralysis
<input type="radio"/>	D. Absence seizure
<input type="radio"/>	E. Myasthenia gravis

Next question

Cataplexy

Cataplexy describes the sudden and transient loss of muscular tone caused by strong emotion (e.g. laughter, being frightened). Around two-thirds of patients with narcolepsy have cataplexy.



Features range from buckling knees to collapse.



Question 44 of 128

Next

A 34-year-old man presents with episodes of severe pain around his right eye. These occur once or twice a day and typically last 30 minutes. The episodes started around 1 week ago and whilst severe have not been getting worse. During an attack his girlfriend reports that his eye goes red and starts to water. Examination of his eye now including visual acuity is normal. His last episode was around 3 hours ago and he is now pain free. What is the most appropriate next step?

- | | | |
|---|----------------------------------|---|
|  | <input type="radio"/> | A. Arrange a same day ophthalmology review |
|  | <input checked="" type="radio"/> | B. Discuss with a neurologist the need for neuroimaging |
| | <input type="radio"/> | C. Start carbamazepine |
| | <input type="radio"/> | D. Start propranolol |
| | <input type="radio"/> | E. Advise him to take paracetamol and ibuprofen if he has any further attacks |

[Next question](#)

These are cluster headaches. As this is the first episode neuroimaging should be discussed with a specialist. There is no role for simple analgesia in cluster headaches.

Cluster headache

Cluster headaches* are more common in men (5:1) and smokers.

Features

- pain typical occurs once or twice a day, each episode lasting 15 mins - 2 hours
- clusters typically last 4-12 weeks
- intense pain around one eye (recurrent attacks 'always' affect same side)
- patient is restless during an attack
- accompanied by redness, lacrimation, lid swelling
- nasal stuffiness
- miosis and ptosis in a minority

Management

- acute: 100% oxygen, subcutaneous or a nasal triptan
- prophylaxis: verapamil, prednisolone

- NICE recommend seeking specialist advice from a neurologist if a patient develops cluster headaches with respect to neuroimaging

*some neurologists use the term trigeminal autonomic cephalgia to group a number of conditions including cluster headache, paroxysmal hemicrania and short-lived unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT). It is recommended such patients are referred for specialist assessment as specific treatment may be required, for example it is known paroxysmal hemicrania responds very well to indomethacin



Question 45 of 128

Next

A 30-year-old woman who suffers from menstrual migraine comes for review. Every month she gets a severe headache just before her period is due to start. Which one of the following do NICE recommend to try and stop the headaches developing?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Subcutaneous sumatriptan (6mg bd) on the days around the start of menstruation |
| <input checked="" type="radio"/> | B. Frovatriptan (2.5 mg twice a day) on the days around the start of menstruation |
| <input type="radio"/> | C. Mefenamic acid (500mg tds) on the days around the start of menstruation |
| <input type="radio"/> | D. Clonidine (50mcg bd) on the days around the start of menstruation |
| <input type="radio"/> | E. Pizotifen (1.5mg od) on the days around the start of menstruation |

Next question

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 46 of 128

Next

A 72-year-old woman with a past history of treated hypertension presents for review. Yesterday she had a 2 hour episode where she couldn't find the right word when speaking. This has never happened before and there were no associated features. Neurological examination is unremarkable and blood pressure was 150/100 mmHg. Her only current medication is amlodipine. What is the most appropriate management?



A. Aspirin 300mg immediately + specialist review within 2 weeks

- ☐ B. Specialist review within 2 weeks
- ✓ ☒ C. Aspirin 300mg immediately + specialist review within 24 hours
- ☐ D. Aspirin 75mg + outpatient CT brain
- ☐ E. Specialist review within 24 hours

Next question

This patient has had a transient ischaemic attack (TIA). Her age, blood pressure and duration of symptoms put her in a higher risk category. Current guidelines advocate specialist review within 24 hours.

If a patient's symptoms have not fully resolved then aspirin should be withheld until an haemorrhagic stroke has been excluded. As this is a transient ischaemic attack (symptoms last less than 24 hours) aspirin should be given as soon as possible.

Transient ischaemic attack

NICE issued updated guidelines relating to stroke and transient ischaemic attack (TIA) in 2008. They advocated the use of the ABCD2 prognostic score for risk stratifying patients who've had a suspected TIA:

	Criteria	Points
A	Age \geq 60 years	1
B	Blood pressure \geq 140/90 mmHg	1
C	Clinical features	
	- Unilateral weakness	2
	- Speech disturbance, no weakness	1
D	Duration of symptoms	
	- > 60 minutes	2
	- 10-59 minutes	1
	Patient has diabetes	1

This gives a total score ranging from 0 to 7. People who have had a suspected TIA who are at a higher risk of stroke (that is, with an ABCD2 score of 4 or above) should have:

- aspirin (300 mg daily) started immediately
- specialist assessment and investigation within 24 hours of onset of symptoms
- measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors

If the ABCD2 risk score is 3 or below:

- specialist assessment within 1 week of symptom onset, including decision on brain imaging
- if vascular territory or pathology is uncertain, refer for brain imaging

People with crescendo TIAs (two or more episodes in a week) should be treated as being at high risk of stroke, even though they may have an ABCD2 score of 3 or below.

Antithrombotic therapy

- clopidogrel is recommended first-line (as for patients who've had a stroke)
- aspirin + dipyridamole should be given to patients who cannot tolerate clopidogrel
- these recommendations follow the 2012 Royal College of Physicians National clinical guideline for stroke. Please see the link for more details (section 5.5)
- these guidelines may change following the CHANCE study (NEJM 2013;369:11). This study looked at giving high-risk TIA patients aspirin + clopidogrel for the first 90 days compared to aspirin alone. 11.7% of aspirin only patients had a stroke over 90 days compared to 8.2% of dual antiplatelet patients

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST* criteria or > 50% according to NASCET** criteria

*European Carotid Surgery Trialists' Collaborative Group

**North American Symptomatic Carotid Endarterectomy Trial



Question 47 of 128

Next

A 56-year-old man presents to the Emergency Department after developing trouble talking after waking up this morning. The symptoms are consistent with expressive dysphasia and lasted about 90 minutes before resolving completely. Neurological examination is unremarkable. A diagnosis of transient ischaemic attack (TIA) is made.

His past medical history includes ischaemic heart disease for which he is prescribed aspirin, simvastatin and atenolol. Which one of the following factors is most associated with an increased risk of going on to have a stroke?



- ☐ A. History of ischaemic heart disease
- ☐ B. History of aspirin use
- ☒ C. Duration of this TIA
- ☐ D. Expressive dysphasia during this TIA
- ☐ E. His age

Next question

This TIA lasted greater than 60 minutes which scores 2 as part of the ABCD2 prognostic scoring system. It is therefore the most significant factor which would increase his risk of going on to have a stroke.

Transient ischaemic attack

NICE issued updated guidelines relating to stroke and transient ischaemic attack (TIA) in 2008. They advocated the use of the ABCD2 prognostic score for risk stratifying patients who've had a suspected TIA:

	Criteria	Points
A	Age \geq 60 years	1
B	Blood pressure \geq 140/90 mmHg	1

	Criteria	Points
C	Clinical features	
	- Unilateral weakness	2
	- Speech disturbance, no weakness	1
D	Duration of symptoms	
	- > 60 minutes	2
	- 10-59 minutes	1
	Patient has diabetes	1

This gives a total score ranging from 0 to 7. People who have had a suspected TIA who are at a higher risk of stroke (that is, with an ABCD2 score of 4 or above) should have:

- aspirin (300 mg daily) started immediately
- specialist assessment and investigation within 24 hours of onset of symptoms
- measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors

If the ABCD2 risk score is 3 or below:

- specialist assessment within 1 week of symptom onset, including decision on brain imaging
- if vascular territory or pathology is uncertain, refer for brain imaging

People with crescendo TIAs (two or more episodes in a week) should be treated as being at high risk of stroke, even though they may have an ABCD2 score of 3 or below.

Antithrombotic therapy

- clopidogrel is recommended first-line (as for patients who've had a stroke)
- aspirin + dipyridamole should be given to patients who cannot tolerate clopidogrel
- these recommendations follow the 2012 Royal College of Physicians National clinical guideline for stroke. Please see the link for more details (section 5.5)
- these guidelines may change following the CHANCE study (NEJM 2013;369:11). This study looked at giving high-risk TIA patients aspirin + clopidogrel for the first 90 days compared to aspirin alone. 11.7% of aspirin only patients had a stroke over 90 days compared to 8.2% of dual antiplatelet patients

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST* criteria or > 50% according to NASCET** criteria

*European Carotid Surgery Trialists' Collaborative Group

**North American Symptomatic Carotid Endarterectomy Trial



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Next

You review a 25-year-old man who is complaining of leg weakness. Other than a bout of diarrhoea three weeks ago he has been feeling fit and well and has no significant medical history. On examination you note reduced power in his legs, normal sensation and reduced knee and ankle reflexes. What is the most likely diagnosis?



- | | |
|----------------------------------|----------------------------|
| <input type="radio"/> | A. Botulism food poisoning |
| <input checked="" type="radio"/> | B. Guillain-Barre syndrome |
| <input type="radio"/> | C. Cauda equina syndrome |
| <input type="radio"/> | D. Myasthenia gravis |
| <input type="radio"/> | E. Lyme disease |

Next question

Guillain-Barre syndrome: features

Guillain-Barre syndrome describes an immune mediated demyelination of the peripheral nervous system often triggered by an infection (classically *Campylobacter jejuni*).

The characteristic features of Guillain-Barre syndrome is progressive weakness of all four limbs. The

weakness is classically ascending i.e. the lower extremities are affected first, however it tends to affect proximal muscles earlier than the distal ones. Sensory symptoms tend to be mild (e.g. distal paraesthesia) with very few sensory signs. Some patients experience back pain in the initial stages of the illness

Other features

- areflexia
- cranial nerve involvement e.g. diplopia
- autonomic involvement: e.g. urinary retention

Less common findings

- papilloedema: thought to be secondary to reduced CSF resorption



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Next

A 19-year-old presents as she would like to start a combined oral contraceptive pill. During the history she states that in the past she has had migraine with aura. She asks why the combined oral contraceptive pill is contraindicated. What is the most appropriate response?



<input type="radio"/>	A. Theoretical risk of ischaemic stroke
<input checked="" type="radio"/>	B. Significantly increased risk of ischaemic stroke
<input type="radio"/>	C. Increased frequency of migraines
<input type="radio"/>	D. Migraine is an independent risk factor for venous thromboembolism
<input type="radio"/>	E. Increased severity of migraines

Next question

SIGN produced guidelines in 2008 on the management of migraine, the following is selected highlights:

Migraine during pregnancy

- paracetamol 1g is first-line
- aspirin 300mg or ibuprofen 400mg can be used second-line in the first and second trimester

Migraine and the combined oral contraceptive (COC) pill

- if patients have migraine with aura then the COC is absolutely contraindicated due to an increased risk of stroke (relative risk 8.72)

Migraine and menstruation

- many women find that the frequency and severity of migraines increase around the time of menstruation
- SIGN recommends that women are treated with mefenamic acid or a combination of aspirin, paracetamol and caffeine. Triptans are also recommended in the acute situation

Migraine and hormone replacement therapy (HRT)

- safe to prescribe HRT for patients with a history of migraine but it may make migraines worse



Question 50 of 128

Next

A 72-year-old man who is being treated for Parkinson's disease is reviewed. Which one of the following features should prompt you to consider an alternative diagnosis?



A. Micrographia

<input type="radio"/>	B. Impaired olfaction
<input type="radio"/>	C. REM sleep behaviour disorder
<input checked="" type="radio"/>	D. Diplopia
<input type="radio"/>	E. Psychosis

Next question

Diplopia is not common in Parkinson's disease and may suggest an alternative cause of parkinsonism such as progressive supranuclear palsy

Parkinson's disease: features

Parkinson's disease is a progressive neurodegenerative condition caused by degeneration of dopaminergic neurons in the substantia nigra.. This results in a classic triad of features: bradykinesia, tremor and rigidity. The symptoms of Parkinson's disease are characteristically asymmetrical.

Epidemiology

- around twice as common in men
- mean age of diagnosis is 65 years

Bradykinesia

- poverty of movement also seen, sometimes referred to as hypokinesia
- short, shuffling steps with reduced arm swinging
- difficulty in initiating movement

Tremor

- most marked at rest, 3-5 Hz
- worse when stressed or tired
- typically 'pill-rolling', i.e. in the thumb and index finger

Rigidity

- lead pipe
- cogwheel: due to superimposed tremor

Other characteristic features

- mask-like facies
- flexed posture
- micrographia
- drooling of saliva
- psychiatric features: depression is the most common feature (affects about 40%); dementia, psychosis and sleep disturbances may also occur
- impaired olfaction
- REM sleep behaviour disorder

Drug-induced parkinsonism has slightly different features to Parkinson's disease:

- motor symptoms are generally rapid onset and bilateral
- rigidity and rest tremor are uncommon



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Next

A 51-year-old woman who is known to have poorly controlled type 1 diabetes mellitus is reviewed. Her main presenting complaint is bloating and vomiting after eating. She also notes that her blood glucose readings have become more erratic recently. Which one of the following medications is most likely to be beneficial?



<input type="radio"/>	A. <i>Helicobacter pylori</i> eradication therapy
<input type="radio"/>	B. Lansoprazole
<input type="radio"/>	C. Amitriptyline
<input checked="" type="radio"/>	D. Metoclopramide
<input type="radio"/>	E. Cyclizine

Diabetic neuropathy

NICE updated its guidance on the management of neuropathic pain in 2013. Diabetic neuropathy is now managed in the same way as other forms of neuropathic pain:

- first-line treatment: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

Gastroparesis

- symptoms include erratic blood glucose control, bloating and vomiting
- management options include metoclopramide, domperidone or erythromycin (prokinetic agents)

**Question 52 of 128**

Next

You review a 60-year-old man who complains that he is 'tripping over' all the time. Whilst examining him you notice he has a 'high-stepping' gait - he tends to excessively flex his knees to ensure the feet 'clear' the ground when walking. What is the most likely cause for this examination finding?



<input checked="" type="radio"/>	A. Peripheral neuropathy
<input type="radio"/>	B. Myasthenia gravis
<input type="radio"/>	C. Parkinson's disease
<input type="radio"/>	D. Polymyalgia rheumatica



E. Knee osteoarthritis

[Next question](#)

A high-stepping gait develops to compensate for foot drop. If found unilaterally then a common peroneal nerve lesion should be suspected. Bilateral foot drop is more likely to be due to peripheral neuropathy.

Peripheral neuropathy

Peripheral neuropathy may be divided into conditions which predominately cause a motor or sensory loss

Predominately motor loss

- Guillain-Barre syndrome
- porphyria
- lead poisoning
- hereditary sensorimotor neuropathies (HSMN) - Charcot-Marie-Tooth
- chronic inflammatory demyelinating polyneuropathy (CIDP)
- diphtheria

Predominately sensory loss

- diabetes
- uraemia
- leprosy
- alcoholism
- vitamin B12 deficiency
- amyloidosis

Alcoholic neuropathy

- secondary to both direct toxic effects and reduced absorption of B vitamins
- sensory symptoms typically present prior to motor symptoms

Vitamin B12 deficiency

- subacute combined degeneration of spinal cord

- dorsal column usually affected first (joint position, vibration) prior to distal paraesthesia



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Next

A 46-year-old female presents with a burning sensation over the antero-lateral aspect of her right thigh. A diagnosis of meralgia paraesthetica is suspected. Which nerve is most likely to be affected?



<input type="radio"/>	A. Common peroneal nerve
<input type="radio"/>	B. Anterior cutaneous nerve of thigh
<input type="radio"/>	C. Posterior cutaneous nerve of thigh
<input checked="" type="radio"/>	D. Lateral cutaneous nerve of thigh
<input type="radio"/>	E. Sciatic nerve

Next question

Burning thigh pain - ? meralgia paraesthetica - lateral cutaneous nerve of thigh compression

Meralgia paraesthetica

Basics

- caused by compression of lateral cutaneous nerve of thigh
- typically burning sensation over antero-lateral aspect of thigh

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Next



A 52-year-old man with a history of epilepsy is reviewed. Since having his medication change he has experienced a 'numbness' of his hands and feet. On examination he has reduced sensation in a glove-and-stocking distribution associated with a reduced ankle reflex. He is also noted to have lymphadenopathy in the cervical and inguinal region and some bleeding around the gums. Which one of the following medications is he most likely to have been taking?



- | | |
|----------------------------------|---------------------|
| <input type="radio"/> | A. Carbamazepine |
| <input checked="" type="radio"/> | B. Phenytoin |
| <input type="radio"/> | C. Topiramate |
| <input type="radio"/> | D. Sodium valproate |
| <input type="radio"/> | E. Lamotrigine |

[Next question](#)

Phenytoin

Phenytoin is used to in the management of seizures.

Mechanism of action

- sodium channel blocker, decreasing the sodium influx into neurons which in turn decreases excitability

Phenytoin is associated with a large number of adverse effects. These may be divided into acute, chronic, idiosyncratic and teratogenic

Acute

- initially: dizziness, diplopia, nystagmus, slurred speech, ataxia
- later: confusion, seizures

Chronic

- common: gingival hyperplasia (secondary to increased expression of platelet derived growth factor, PDGF), hirsutism, coarsening of facial features, drowsiness
- megaloblastic anaemia (secondary to altered folate metabolism)
- peripheral neuropathy
- enhanced vitamin D metabolism causing osteomalacia
- lymphadenopathy
- dyskinesia

Idiosyncratic

- fever
- rashes, including severe reactions such as toxic epidermal necrolysis
- hepatitis
- Dupuytren's contracture*
- aplastic anaemia
- drug-induced lupus

Teratogenic

- associated with cleft palate and congenital heart disease

*although not listed in the BNF



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Next

Which one of the following is a contraindication to the use of a triptan in the management of migraine?



<input type="radio"/>	A. Concurrent pizotifen use
<input type="radio"/>	B. Patients older than 55 years
<input type="radio"/>	C. A history of epilepsy
<input checked="" type="radio"/>	D. Previous intracranial tumour



E. A history of ischaemic heart disease

[Next question](#)

Triptans

Triptans are specific 5-HT₁ agonists used in the acute treatment of migraine. They are generally used first-line in combination therapy with an NSAID or paracetamol.

Prescribing points

- should be taken as soon as possible after the onset of headache, rather than at onset of aura
- oral, orodispersible, nasal spray and subcutaneous injections are available

Adverse effects

- 'triptan sensations' - tingling, heat, tightness (e.g. throat and chest), heaviness, pressure

Contraindications

- patients with a history of, or significant risk factors for, ischaemic heart disease or cerebrovascular disease



Question 56 of 128

[Next](#)

A 59-year-old man with no significant past medical history is admitted to hospital following an ischaemic stroke. He presented outside of the thrombolysis window and is treated with aspirin for the first few days. His blood pressure is 130/80 mmHg, fasting glucose is 5.6 mmol/l and fasting cholesterol is 3.9 mmol/l. He makes a good recovery and has regained nearly all of his previous functions upon discharge. Following recent NICE guidelines, which of the following medications should he be taking upon discharge (i.e. after 14 days)?

-  ☐ A. Aspirin + statin
- ☐ B. Aspirin + dipyridamole + statin + ramipril
-  ☒ C. Clopidogrel + statin
- ☐ D. Aspirin + dipyridamole
- ☐ E. Aspirin + dipyridamole + statin

[Next question](#)

Stroke: management

The Royal College of Physicians (RCP) published guidelines on the diagnosis and management of patients following a stroke in 2004. NICE also issued stroke guidelines in 2008, although they modified their guidance with respect to antiplatelet therapy in 2010.

Selected points relating to the management of acute stroke include:

- blood glucose, hydration, oxygen saturation and temperature should be maintained within normal limits
- blood pressure should not be lowered in the acute phase unless there are complications e.g. Hypertensive encephalopathy*
- aspirin 300mg orally or rectally should be given as soon as possible if a haemorrhagic stroke has been excluded
- with regards to atrial fibrillation, the RCP state: 'anticoagulants should not be started until brain imaging has excluded haemorrhage, and usually not until 14 days have passed from the onset of an ischaemic stroke'
- if the cholesterol is > 3.5 mmol/l patients should be commenced on a statin. Many physicians will delay treatment until after at least 48 hours due to the risk of haemorrhagic transformation

Thrombolysis

Thrombolysis should only be given if:

- it is administered within 4.5 hours of onset of stroke symptoms (unless as part of a clinical trial)
- haemorrhage has been definitively excluded (i.e. Imaging has been performed)

Alteplase is currently recommended by NICE.

Contraindications to thrombolysis:

Absolute	Relative
<ul style="list-style-type: none"> - Previous intracranial haemorrhage - Seizure at onset of stroke - Intracranial neoplasm - Suspected subarachnoid haemorrhage - Stroke or traumatic brain injury in preceding 3 months - Lumbar puncture in preceding 7 days - Gastrointestinal haemorrhage in preceding 3 weeks - Active bleeding - Pregnancy - Oesophageal varices - Uncontrolled hypertension >200/120mmHg 	<ul style="list-style-type: none"> - Concurrent anticoagulation (INR >1.7) - Haemorrhagic diathesis - Active diabetic haemorrhagic retinopathy - Suspected intracardiac thrombus - Major surgery / trauma in preceding 2 weeks

Secondary prevention

NICE also published a technology appraisal in 2010 on the use of clopidogrel and dipyridamole

Recommendations from NICE include:

- clopidogrel is now recommended by NICE ahead of combination use of aspirin plus modified release (MR) dipyridamole in people who have had an ischaemic stroke
- aspirin plus MR dipyridamole is now recommended after an ischaemic stroke only if clopidogrel is contraindicated or not tolerated, but treatment is no longer limited to 2 years' duration
- MR dipyridamole alone is recommended after an ischaemic stroke only if aspirin or clopidogrel are contraindicated or not tolerated, again with no limit on duration of treatment

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST** criteria or > 50% according to NASCET*** criteria

*the 2009 Controlling hypertension and hypotension immediately post-stroke (CHHIPS) trial may change thinking on this but guidelines have yet to change to reflect this

**European Carotid Surgery Trialists' Collaborative Group

***North American Symptomatic Carotid Endarterectomy Trial



Question 57 of 128

Next

A 45-year-old alcoholic patient starts to fit in the waiting room. You place him in the recovery position and apply oxygen. After 5 minutes he is still fitting. What is the most appropriate medication to administer?



- | | |
|----------------------------------|---------------------------|
| <input type="radio"/> | A. Rectal midazolam 5 mg |
| <input type="radio"/> | B. Rectal thiamine 200 mg |
| <input type="radio"/> | C. Rectal diazepam 5 mg |
| <input type="radio"/> | D. Rectal diazepam 2.5 mg |
| <input checked="" type="radio"/> | E. Rectal diazepam 10 mg |

Next question

The pre-hospital management of convulsions is specifically mentioned in the RCGP curriculum.

Seizures: acute management

Most seizures are self-limiting and stop spontaneously but prolonged seizures may be potentially life-threatening.

Basics

- check the airway and apply oxygen if appropriate

- place the patient in the recovery position
- if the seizure is prolonged give benzodiazepines

BNF recommend dose for rectal diazepam, repeated once after 10-15 minutes if necessary

Neonate	1.25 - 2.5 mg
Child 1 month - 2 years	5 mg
Child 2 years - 12 years	5 - 10 mg
Child 12 years - 18 years	10 mg
Adult	10 - 20 mg (max. 30 mg)
Elderly	10 mg (max. 15 mg)

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Next

Theme: Causes of tremor

A.	Anxiety
B.	Opiate withdrawal
C.	Alcohol withdrawal
D.	Hepatic encephalopathy
E.	Parkinsonism
F.	Essential tremor
G.	Thyrotoxicosis
H.	Carbon dioxide retention
I.	Cerebellar disease
J.	Wilson's disease

For each one of the following scenarios select the most likely diagnosis:

58. A 62-year-old man is seen on a home visit. He has a history of treated hypothyroidism and COPD. His wife reports he is more confused. When he stretches both arms out a 'flap' is noted

 You answered Anxiety

The correct answer is Carbon dioxide retention

59. A 55-year-old woman complains she is losing weight. On examination her pulse is 102 bpm and she has a fine tremor when her hands are outstretched

 You answered Anxiety

The correct answer is Thyrotoxicosis

60. A 28-year-old man presents with a tremor in both hands. This is most noticeable when he uses his hands. He has a strong family history of similar problems

 You answered Opiate withdrawal

The correct answer is Essential tremor

[Next question](#)

Tremor

The table below lists the main characteristics of the most important causes of tremor

Parkinsonism	Resting, 'pill-rolling' tremor Bradykinesia Rigidity Flexed posture, short, shuffling steps Micrographia 'Mask-like' face Depression & dementia are common May be history of anti-psychotic use
Essential tremor	Postural tremor: worse if arms outstretched

Parkinsonism	Resting, 'pill-rolling' tremor Bradykinesia Rigidity Flexed posture, short, shuffling steps Micrographia 'Mask-like' face Depression & dementia are common May be history of anti-psychotic use
	Improved by alcohol and rest Titubation Often strong family history
Anxiety	History of depression
Thyrotoxicosis	Usual thyroid signs e.g. Weight loss, tachycardia, feeling hot etc
Hepatic encephalopathy	History of chronic liver disease
Carbon dioxide retention	History of chronic obstructive pulmonary disease
Cerebellar disease	Intention tremor Cerebellar signs e.g. Past-pointing, nystagmus etc

Other causes

- drug withdrawal: alcohol, opiates



Question 61 of 128

Next

Which one of the following side-effects is not recognised in patients taking sodium valproate?



- | | |
|----------------------------------|----------------|
| <input type="radio"/> | A. Alopecia |
| <input checked="" type="radio"/> | B. Weight gain |
| <input type="radio"/> | C. Hepatitis |



D. Induction P450 system



E. Teratogenicity

Next question

Sodium valproate causes inhibition of the P450 system

Sodium valproate

Sodium valproate is used in the management of epilepsy and is first line therapy for generalised seizures. It works by increasing GABA activity.

Adverse effects

- gastrointestinal: nausea
- increased appetite and weight gain
- alopecia: regrowth may be curly
- ataxia
- tremor
- hepatitis
- pancreatitis
- thrombocytopaenia
- teratogenic
- hyponatraemia



Question 62 of 128

Next

An obese 24-year-old female presents with headaches and blurred vision to her GP. Examination reveals bilateral blurring of the optic discs but is otherwise unremarkable with no other neurological signs. Blood pressure is 130/74 and she is afebrile. What is the most likely underlying diagnosis?



A. Multiple sclerosis



B. Meningococcal meningitis

☐

C. Brain abscess

☐

D. Normal pressure hydrocephalus

☒

E. Idiopathic intracranial hypertension

Next question

Obese, young female with headaches / blurred vision think idiopathic intracranial hypertension

The combination of a young, obese female with papilloedema but otherwise normal neurology makes idiopathic intracranial hypertension the most likely diagnosis

Idiopathic intracranial hypertension

Idiopathic intracranial hypertension (also known as pseudotumour cerebri and formerly benign intracranial hypertension) is a condition classically seen in young, overweight females.

Features

- headache
- blurred vision
- papilloedema (usually present)
- enlarged blind spot
- sixth nerve palsy may be present

Risk factors

- obesity
- female sex
- pregnancy
- drugs*: oral contraceptive pill, steroids, tetracycline, vitamin A

Management

- weight loss
- diuretics e.g. acetazolamide
- repeated lumbar puncture

- surgery: optic nerve sheath decompression and fenestration may be needed to prevent damage to the optic nerve. A lumboperitoneal or ventriculoperitoneal shunt may also be performed to reduce intracranial pressure

*if intracranial hypertension is thought to occur secondary to a known causes (e.g. Medication) then it is of course not idiopathic



Question 63 of 128

Next

A 45-year-old female with a history of epilepsy is reviewed in the surgery. Which one of the following features is most likely to be attributable to sodium valproate therapy?



<input type="radio"/>	A. Clubbing
<input type="radio"/>	B. Weight loss
<input type="radio"/>	C. Hirsutism
<input type="radio"/>	D. Renal impairment
<input checked="" type="radio"/>	E. Tremor

Next question

Alopecia is much more common than hirsutism in patients treated with sodium valproate.

In the BNF tremor is listed as a 'less frequent' side effect whereas hirsutism is listed as a 'very rare' side effect.

Sodium valproate

Sodium valproate is used in the management of epilepsy and is first line therapy for generalised seizures. It works by increasing GABA activity.

Adverse effects

- gastrointestinal: nausea
- increased appetite and weight gain

- alopecia: regrowth may be curly
- ataxia
- tremor
- hepatitis
- pancreatitis
- thrombocytopaenia
- teratogenic
- hyponatraemia



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Next

A 34-year-old man with a history of migraine finds that paracetamol taken at the recommend dose often fails to relieve his acute attacks. He drinks 12 units of alcohol per week and smokes 15 cigarettes per day.

What factor is likely to contribute to this problem?



<input type="radio"/>	A. Bacterial overgrowth
<input checked="" type="radio"/>	B. Delayed gastric emptying
<input type="radio"/>	C. P450 enzyme induction
<input type="radio"/>	D. First pass metabolism
<input type="radio"/>	E. P450 enzyme inhibition

Next question

Patients with migraine experience delayed gastric emptying during acute attacks. For this reason analgesics are often combined prokinetic agents such as metoclopramide. Paracetamol metabolism would not be significantly affected by changes in P450 enzyme activity (e.g. through smoking or drinking)

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of

migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop

Next

A 65-year-old man is referred to the neurology outpatient clinic due to a resting tremor of his right hand. A diagnosis of Parkinson's disease is made. He is otherwise well and is not currently disabled by his symptoms. What is the most appropriate treatment?

- | | |
|------------------------------------|--|
| <input type="radio"/> | A. Selegiline |
| ✓ <input checked="" type="radio"/> | B. No treatment |
| <input type="radio"/> | C. New generation dopamine receptor agonist e.g. ropinirole |
| <input type="radio"/> | D. Conventional dopamine receptor agonist e.g. bromocriptine |
| ✗ <input type="radio"/> | E. Antimuscarinics |

Next question

Parkinson's disease: management

Currently accepted practice in the management of patients with Parkinson's disease (PD) is to delay treatment until the onset of disabling symptoms and then to introduce a dopamine receptor agonist. If the patient is elderly, levodopa is sometimes used as an initial treatment.

Dopamine receptor agonists

- e.g. Bromocriptine, ropinirole, cabergoline, apomorphine
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide*) have been associated with pulmonary, retroperitoneal and cardiac fibrosis. The Committee on Safety of Medicines advice that an echocardiogram, ESR, creatinine and chest x-ray should be obtained prior to treatment and patients should be closely monitored
- patients should be warned about the potential for dopamine receptor agonists to cause impulse control disorders and excessive daytime somnolence
- more likely than levodopa to cause hallucinations in older patients. Nasal congestion and postural hypotension are also seen in some patients

Levodopa

- usually combined with a decarboxylase inhibitor (e.g. carbidopa or benserazide) to prevent peripheral metabolism of levodopa to dopamine
- reduced effectiveness with time (usually by 2 years)
- unwanted effects: dyskinesia (involuntary writhing movements), 'on-off' effect, dry mouth, anorexia, palpitations, postural hypotension, psychosis, drowsiness
- no use in neuroleptic induced parkinsonism

MAO-B (Monoamine Oxidase-B) inhibitors

- e.g. Selegiline
- inhibits the breakdown of dopamine secreted by the dopaminergic neurons

Amantadine

- mechanism is not fully understood, probably increases dopamine release and inhibits its uptake at dopaminergic synapses
- side-effects include ataxia, slurred speech, confusion, dizziness and livedo reticularis

COMT (Catechol-O-Methyl Transferase) inhibitors

- e.g. Entacapone, tolcapone
- COMT is an enzyme involved in the breakdown of dopamine, and hence may be used as an adjunct to levodopa therapy
- used in conjunction with levodopa in patients with established PD

Antimuscarinics

- block cholinergic receptors
- now used more to treat drug-induced parkinsonism rather than idiopathic Parkinson's disease
- help tremor and rigidity
- e.g. procyclidine, benzotropine, trihexyphenidyl (benzhexol)

*pergolide was withdrawn from the US market in March 2007 due to concern regarding increased incidence of valvular dysfunction



Question 66 of 128

Next

A 23-year-old woman is referred to the neurology clinic after developing a unilateral hand tremor. Over the past 12 months her family report changes in her behaviour and mood associated with some speech problems. On examination a tremor is noted in the right-hand at rest. There also appears to

be paucity of movement and some bradykinesia. Dark circular marks are also noted around the iris. The patient reports that her uncle died of liver cirrhosis at the age of 40 years. What is the most likely diagnosis?

	<input type="radio"/>	A. Multiple sclerosis
	<input type="radio"/>	B. Parkinson's disease
	<input checked="" type="radio"/>	C. Wilson's disease
	<input type="radio"/>	D. α 1-antitrypsin deficiency
	<input type="radio"/>	E. Huntington's disease

Next question

This patient has Wilson's disease as evidence by the neuropsychiatric symptoms, Kayser-Fleischer rings and family history of liver disease.

Wilson's disease

Wilson's disease is an autosomal recessive disorder characterised by excessive copper deposition in the tissues. Metabolic abnormalities include increased copper absorption from the small intestine and decreased hepatic copper excretion. Wilson's disease is caused by a defect in the ATP7B gene located on chromosome 13.

The onset of symptoms is usually between 10 - 25 years. Children usually present with liver disease whereas the first sign of disease in young adults is often neurological disease

Features result from excessive copper deposition in the tissues, especially the brain, liver and cornea:

- liver: hepatitis, cirrhosis
- neurological: basal ganglia degeneration, speech and behavioural problems are often the first manifestations. Also: asterixis, chorea, dementia
- Kayser-Fleischer rings
- renal tubular acidosis (esp. Fanconi syndrome)
- haemolysis
- blue nails

Diagnosis

- reduced serum caeruloplasmin
- increased 24hr urinary copper excretion

Management

- penicillamine (chelates copper) has been the traditional first-line treatment
- trientine hydrochloride is an alternative chelating agent which may become first-line treatment in the future
- tetrathiomolybdate is a newer agent that is currently under investigation



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Next

A 60-year-old man is referred to the rapid access TIA clinic after experiencing a number of transient episodes of right-sided weakness. Which one of the following factors is not part of ABCD2 score used to estimate his risk of future stroke?

<input type="radio"/>	A. Clinical features
<input checked="" type="radio"/>	B. History of diabetes mellitus
<input type="radio"/>	C. Blood pressure
<input checked="" type="radio"/>	D. History of aspirin use
<input type="radio"/>	E. Duration of symptoms

Next question

Transient ischaemic attack

NICE issued updated guidelines relating to stroke and transient ischaemic attack (TIA) in 2008. They

advocated the use of the ABCD2 prognostic score for risk stratifying patients who've had a suspected TIA:

	Criteria	Points
A	Age \geq 60 years	1
B	Blood pressure \geq 140/90 mmHg	1
C	Clinical features	
	- Unilateral weakness	2
	- Speech disturbance, no weakness	1
D	Duration of symptoms	
	- > 60 minutes	2
	- 10-59 minutes	1
	Patient has diabetes	1

This gives a total score ranging from 0 to 7. People who have had a suspected TIA who are at a higher risk of stroke (that is, with an ABCD2 score of 4 or above) should have:

- aspirin (300 mg daily) started immediately
- specialist assessment and investigation within 24 hours of onset of symptoms
- measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors

If the ABCD2 risk score is 3 or below:

- specialist assessment within 1 week of symptom onset, including decision on brain imaging
- if vascular territory or pathology is uncertain, refer for brain imaging

People with crescendo TIAs (two or more episodes in a week) should be treated as being at high risk of stroke, even though they may have an ABCD2 score of 3 or below.

Antithrombotic therapy

- clopidogrel is recommended first-line (as for patients who've had a stroke)
- aspirin + dipyridamole should be given to patients who cannot tolerate clopidogrel

- these recommendations follow the 2012 Royal College of Physicians National clinical guideline for stroke. Please see the link for more details (section 5.5)
- these guidelines may change following the CHANCE study (NEJM 2013;369:11). This study looked at giving high-risk TIA patients aspirin + clopidogrel for the first 90 days compared to aspirin alone. 11.7% of aspirin only patients had a stroke over 90 days compared to 8.2% of dual antiplatelet patients

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST* criteria or > 50% according to NASCET** criteria

*European Carotid Surgery Trialists' Collaborative Group

**North American Symptomatic Carotid Endarterectomy Trial



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Next

A 76-year-old woman is diagnosed with Alzheimer's disease. Which one of the following could be a contraindication to the prescription of donepezil?

<input type="radio"/>	A. History of depression
<input checked="" type="radio"/>	B. Sick sinus syndrome
<input type="radio"/>	C. Concurrent simvastatin therapy
<input type="radio"/>	D. Concurrent citalopram therapy
<input type="radio"/>	E. Ischaemic heart disease

Next question

Donepezil may cause bradycardia and atrioventricular node block.

Alzheimer's disease

Alzheimer's disease is a progressive degenerative disease of the brain accounting for the majority of dementia seen in the UK

Genetics

- most cases are sporadic
- 5% of cases are inherited as an autosomal dominant trait
- mutations in the amyloid precursor protein (chromosome 21), presenilin 1 (chromosome 14) and presenilin 2 (chromosome 1) genes are thought to cause the inherited form
- apolipoprotein E allele E4 - encodes a cholesterol transport protein

Pathological changes

- macroscopic: widespread cerebral atrophy, particularly involving the cortex and hippocampus
- microscopic: cortical plaques due to deposition of type A-Beta-amyloid protein and intraneuronal neurofibrillary tangles caused by abnormal aggregation of the tau protein
- biochemical: there is a deficit of acetylcholine from damage to an ascending forebrain projection

Neurofibrillary tangles

- paired helical filaments are partly made from a protein called tau
- in AD tau proteins are excessively phosphorylated

Management

- NICE now recommend the three acetylcholinesterase inhibitors (donepezil, galantamine and rivastigmine) as options for managing mild to moderate Alzheimer's disease
- memantine (a NMDA receptor antagonist) is reserved for patients with moderate - severe Alzheimer's



What is the most common type of multiple sclerosis?



- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Relapsing-remitting disease |
| <input type="radio"/> | B. Amyotrophic lateral sclerosis |
| <input checked="" type="radio"/> | C. Secondary progressive disease |
| <input type="radio"/> | D. Progressive-relapsing disease |
| <input type="radio"/> | E. Primary progressive disease |

Next question

Multiple sclerosis

Multiple sclerosis is chronic cell-mediated autoimmune disorder characterised by demyelination in the central nervous system.

Epidemiology

- 3 times more common in women
- most commonly diagnosed in people aged 20-40 years
- much more common at higher latitudes (5 times more common than in tropics)

Genetics

- monozygotic twin concordance = 30%
- dizygotic twin concordance = 2%

A variety of subtypes have been identified:

Relapsing-remitting disease

- most common form, accounts for around 80% of patients
- acute attacks (e.g. last 1-2 months) followed by periods of remission

Secondary progressive disease

- describes relapsing-remitting patients who have deteriorated and have developed neurological signs and symptoms between relapses
- around 65% of patients with relapsing-remitting disease go on to develop secondary progressive disease within 15 years of diagnosis
- gait and bladder disorders are generally seen

Primary progressive disease

- accounts for 10% of patients
- progressive deterioration from onset
- more common in older people



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Next

A 34-year-old man is reviewed in the neurology clinic. He has been established on sodium valproate for primary generalised epilepsy. Despite now taking a therapeutic dose he continues to have seizures and is troubled by weight gain since starting sodium valproate. He asks to stop his current medication and try a different drug. Which one of the following drugs would be the most appropriate second-line treatment?



<input checked="" type="radio"/>	A. Lamotrigine
<input type="radio"/>	B. Ethosuximide
<input type="radio"/>	C. Pregabalin
<input type="radio"/>	D. Gabapentin
<input type="radio"/>	E. Tiagabine

Next question

Monotherapy with another drug should be attempted before combination therapy is started. Caution

should be exercised when combining sodium valproate and lamotrigine as serious skin rashes such as Steven-Johnson's syndrome may be provoked

Epilepsy: treatment

Most neurologists now start antiepileptics following a second epileptic seizure. NICE guidelines suggest starting antiepileptics after the first seizure if any of the following are present:

- the patient has a neurological deficit
- brain imaging shows a structural abnormality
- the EEG shows unequivocal epileptic activity
- the patient or their family or carers consider the risk of having a further seizure unacceptable

Sodium valproate is considered the first line treatment for patients with generalised seizures with carbamazepine used for partial seizures

Generalised tonic-clonic seizures

- sodium valproate
- second line: lamotrigine, carbamazepine

Absence seizures* (Petit mal)

- sodium valproate or ethosuximide
- sodium valproate particularly effective if co-existent tonic-clonic seizures in primary generalised epilepsy

Myoclonic seizures

- sodium valproate
- second line: clonazepam, lamotrigine

Partial seizures

- carbamazepine
- second line: lamotrigine**, sodium valproate

*carbamazepine may actually exacerbate absence seizure

**the 2007 SANAD study indicated that lamotrigine may be a more suitable first-line drug for partial seizures although this has yet to work its way through to guidelines

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Next

Which one of the following is not a feature of essential tremor?

- | | | |
|---|----------------------------------|------------------------------------|
|  | <input type="radio"/> | A. Improved by alcohol |
|  | <input checked="" type="radio"/> | B. Autosomal recessive inheritance |
| | <input type="radio"/> | C. Improved by propranolol |
| | <input type="radio"/> | D. Titubation |
| | <input type="radio"/> | E. Worse on intentional movement |

Next question

Essential tremor is an AD condition that is made worse by intentional movement, made better by alcohol and propranolol

Essential tremor

Essential tremor (previously called benign essential tremor) is an autosomal dominant condition which usually affects both upper limbs

Features

- postural tremor: worse if arms outstretched
- improved by alcohol and rest
- most common cause of titubation (head tremor)

Management

- propranolol is first-line
- primidone is sometimes used



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Next

Which one of the following statements regarding the ROSIER score is correct?



<input checked="" type="radio"/>	A. It includes assessing the patients visual fields
<input type="radio"/>	B. A total score of 2 makes a diagnosis of stroke unlikely
<input type="radio"/>	C. Patients with a score > 4 are candidates for thrombolysis
<input type="radio"/>	D. A history of seizure activity adds + 1 points to the score
<input type="radio"/>	E. It can only be used for symptoms that have resolved

Next question

Stroke: assessment

Whilst the diagnosis of stroke may sometimes be obvious in many cases the presenting symptoms may be vague and accurate assessment difficult.

The FAST screening tool (Face/Arms/Speech/Time) is widely known by the general public following a publicity campaign. It has a positive predictive value of 78%.

A variant of FAST called the ROSIER score is useful for medical professionals. It is validated tool recommended by the Royal College of Physicians.

ROSIER score

Exclude hypoglycaemia first, then assess the following:

Assessment	Scoring
Loss of consciousness or syncope	- 1 point
Seizure activity	- 1 point
New, acute onset of:	
• asymmetric facial weakness	+ 1 point
• asymmetric arm weakness	+ 1 point
• asymmetric leg weakness	+ 1 point
• speech disturbance	+ 1 point
• visual field defect	+ 1 point

A stroke is likely if > 0



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Next

You are considering prescribing pizotifen to a patient who is suffering frequent migraine attacks. Which side-effects are most characteristically associated with the use of pizotifen?



- ☒ A. Weight gain + drowsiness
- ☐ B. Weight gain + retroperitoneal fibrosis
- ☐ C. Heartburn + drowsiness
- ☐ D. Palpitations + weight gain
- ☐ E. Palpitations + sweating

Next question

Pizotifen side-effects: weight gain + drowsiness

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



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Next

A 43-year-old woman with multiple sclerosis presents for review. She is having increasing problems with painful involuntary contractions of the leg muscles. What is the most appropriate first-line therapy?



- | | |
|----------------------------------|------------------------------------|
| <input type="radio"/> | A. Referral for relaxation therapy |
| <input checked="" type="radio"/> | B. Baclofen |
| <input type="radio"/> | C. Diazepam |
| <input type="radio"/> | D. Dantrolene |
| <input type="radio"/> | E. Natalizumab |

Next question

Multiple sclerosis: management

Treatment in multiple sclerosis is focused at reducing the frequency and duration of relapses. There is no cure.

Acute relapse

High dose steroids (e.g. IV methylprednisolone) may be given for 3-5 days to shorten the length of an acute relapse. It should be noted that steroids shorten the duration of a relapse and do not alter the degree of recovery (i.e. whether a patient returns to baseline function)

Disease modifying drugs

Beta-interferon has been shown to reduce the relapse rate by up to 30%. Certain criteria have to be met before it is used:

- relapsing-remitting disease + 2 relapses in past 2 years + able to walk 100m unaided
- secondary progressive disease + 2 relapses in past 2 years + able to walk 10m (aided or unaided)
- reduces number of relapses and MRI changes, however doesn't reduce overall disability

Other drugs used in the management of multiple sclerosis include:

- glatiramer acetate: immunomodulating drug - acts as an 'immune decoy'
- natalizumab: a recombinant monoclonal antibody that antagonises Alpha-4 Beta-1-integrin found on the surface of leucocytes, thus inhibiting migration of leucocytes across the endothelium across the blood-brain barrier
- fingolimod: sphingosine 1-phosphate receptor modulator, prevents lymphocytes from leaving lymph nodes. An oral formulation is available

Some specific problems

Spasticity

- baclofen and gabapentin are first-line. Other options include diazepam, dantrolene and tizanidine
- physiotherapy is important
- cannabis and botox are undergoing evaluation

Bladder dysfunction

- may take the form of urgency, incontinence, overflow etc
- guidelines stress the importance of getting an ultrasound first to assess bladder emptying - anticholinergics may worsen symptoms in some patients
- if significant residual volume → intermittent self-catheterisation
- if no significant residual volume → anticholinergics may improve urinary frequency



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Next

An 18-year-old female presents with troublesome headaches. These have been getting gradually more severe and frequent over the past three years. The headaches typically occur once every 2-3

weeks and are described as a severe, bilateral, throbbing head pain associated with sensitivity to light and lethargy. They typically last around 4-8 hours. When she gets one of these headaches she typically spends the day in bed. They often occur around the time of menstruation.

Neurological examination including fundoscopy is unremarkable.

What is the most appropriate first-line treatment for these acute headaches?

	<input checked="" type="radio"/>	A. Oral triptan + NSAID
	<input type="radio"/>	B. Paracetamol
	<input type="radio"/>	C. Combined oral contraceptive pill
	<input type="radio"/>	D. Progestogen-only pill
	<input type="radio"/>	E. Paracetamol + metoclopramide

Next question

These headaches are characteristic of migraines. Remember that many patients get bilateral symptoms, particularly younger patients.

NICE recommend a combination of either an oral triptan + NSAID or an oral triptan + paracetamol for patients with migraine.

Metoclopramide should be used with caution in younger patients due to the risk of dystonic reactions.

The combined oral contraceptive pill should be avoided in patients who experience migraine.

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol

- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



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Next

A 47-year-old female is reviewed in the neurology clinic. She was diagnosed with epilepsy whilst a teenager and her seizures are well controlled. She is however concerned about increasing numbness of her fingers and soles of her feet. Which one of the following medications is most likely to be responsible?



- | | |
|----------------------------------|----------------|
| <input checked="" type="radio"/> | A. Phenytoin |
| <input type="radio"/> | B. Lamotrigine |

<input type="radio"/>	C. Sodium valproate
<input type="radio"/>	D. Ethosuximide
<input type="radio"/>	E. Levetiracetam

[Next question](#)

Peripheral neuropathy is a known adverse effect of phenytoin

Phenytoin

Phenytoin is used to in the management of seizures.

Mechanism of action

- sodium channel blocker, decreasing the sodium influx into neurons which in turn decreases excitability

Phenytoin is associated with a large number of adverse effects. These may be divided into acute, chronic, idiosyncratic and teratogenic

Acute

- initially: dizziness, diplopia, nystagmus, slurred speech, ataxia
- later: confusion, seizures

Chronic

- common: gingival hyperplasia (secondary to increased expression of platelet derived growth factor, PDGF), hirsutism, coarsening of facial features, drowsiness
- megaloblastic anaemia (secondary to altered folate metabolism)
- peripheral neuropathy
- enhanced vitamin D metabolism causing osteomalacia
- lymphadenopathy
- dyskinesia

Idiosyncratic

- fever
- rashes, including severe reactions such as toxic epidermal necrolysis
- hepatitis
- Dupuytren's contracture*
- aplastic anaemia
- drug-induced lupus

Teratogenic

- associated with cleft palate and congenital heart disease

*although not listed in the BNF



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Next

A 31-year-old female with a history of epilepsy consults you following an uneventful pregnancy. Which one of the following drugs would it be safe to continue during breast feeding?



- | | |
|----------------------------------|---------------------|
| <input type="radio"/> | A. Phenytoin |
| <input type="radio"/> | B. Carbamazepine |
| <input type="radio"/> | C. Lamotrigine |
| <input type="radio"/> | D. Sodium valproate |
| <input checked="" type="radio"/> | E. All of the above |



Next question

Breast feeding is acceptable with nearly all anti-epileptic drugs

The BNF states 'breast-feeding is acceptable with all antiepileptic drugs, taken in normal doses, with the possible exception of barbiturates'

Epilepsy: pregnancy and breast feeding

The risks of uncontrolled epilepsy during pregnancy generally outweigh the risks of medication to the fetus. All women thinking about becoming pregnant should be advised to take folic acid 5mg per day well before pregnancy to minimise the risk of neural tube defects. Around 1-2% of newborns born to non-epileptic mothers have congenital defects. This rises to 3-4% if the mother takes antiepileptic medication.

Other points

- aim for monotherapy
- there is no indication to monitor antiepileptic drug levels
- sodium valproate: associated with neural tube defects
- carbamazepine: often considered the least teratogenic of the older antiepileptics
- phenytoin: associated with cleft palate
- lamotrigine: studies to date suggest the rate of congenital malformations may be low. The dose of lamotrigine may need to be increased in pregnancy

Breast feeding is generally considered safe for mothers taking antiepileptics with the possible exception of the barbiturates

It is advised that pregnant women taking phenytoin are given vitamin K in the last month of pregnancy to prevent clotting disorders in the newborn

Sodium valproate

The November 2013 issue of the Drug Safety Update also carried a warning about new evidence showing a significant risk of neurodevelopmental delay in children following maternal use of sodium valproate.



The update concludes that sodium valproate should not be used during pregnancy and in women of childbearing age unless clearly necessary. Women of childbearing age should not start treatment without specialist neurological or psychiatric advice.



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[Next](#)

Which one of the following statements regarding restless legs syndrome is incorrect?

- | | | |
|---|----------------------------------|---|
|  | <input type="radio"/> | A. Movements may be seen during sleep |
| | <input type="radio"/> | B. May be secondary to uraemia |
| | <input type="radio"/> | C. Affects approximately 5% of the general population |
| | <input type="radio"/> | D. Family history is found in up to 50% of patients |
|  | <input checked="" type="radio"/> | E. It is three times as common in females |

Next question

Males and females are thought to be equally affected, with only one study showing a slightly increased incidence in females

Restless legs syndrome

Restless legs syndrome (RLS) is a syndrome of spontaneous, continuous lower limb movements that may be associated with paraesthesia. It is extremely common, affecting between 2-10% of the general population. Males and females are equally affected and a family history may be present

Clinical features

- uncontrollable urge to move legs (akathisia). Symptoms initially occur at night but as condition progresses may occur during the day. Symptoms are worse at rest
- paraesthesias e.g. 'crawling' or 'throbbing' sensations
- movements during sleep may be noted by the partner - periodic limb movements of sleeps (PLMS)

Causes and associations

- there is a positive family history in 50% of patients with idiopathic RLS
- iron deficiency anaemia
- uraemia
- diabetes mellitus
- pregnancy

The diagnosis is clinical although bloods to exclude iron deficiency anaemia may be appropriate

Management

- simple measures: walking, stretching, massaging affected limbs
- treat any iron deficiency
- dopamine agonists are first-line treatment (e.g. Pramipexole, ropinirole)
- benzodiazepines
- gabapentin



Question 79 of 128

Next

A 69-year-old man is diagnosed as having Parkinson's disease. Which one of the following psychiatric problems is most likely to occur in this patient?



- | | |
|----------------------------------|---------------|
| <input type="radio"/> | A. Tics |
| <input type="radio"/> | B. Psychosis |
| <input type="radio"/> | C. Mania |
| <input type="radio"/> | D. Dementia |
| <input checked="" type="radio"/> | E. Depression |



Next question

Parkinson's disease - most common psychiatric problem is depression

Whilst dementia is common in patients with Parkinson's disease depression is known to exist in around 40%

Parkinson's disease: features

Parkinson's disease is a progressive neurodegenerative condition caused by degeneration of dopaminergic neurons in the substantia nigra.. This results in a classic triad of features: bradykinesia, tremor and rigidity. The symptoms of Parkinson's disease are characteristically

asymmetrical.

Epidemiology

- around twice as common in men
- mean age of diagnosis is 65 years

Bradykinesia

- poverty of movement also seen, sometimes referred to as hypokinesia
- short, shuffling steps with reduced arm swinging
- difficulty in initiating movement

Tremor

- most marked at rest, 3-5 Hz
- worse when stressed or tired
- typically 'pill-rolling', i.e. in the thumb and index finger

Rigidity

- lead pipe
- cogwheel: due to superimposed tremor

Other characteristic features

- mask-like facies
- flexed posture
- micrographia
- drooling of saliva
- psychiatric features: depression is the most common feature (affects about 40%); dementia, psychosis and sleep disturbances may also occur
- impaired olfaction
- REM sleep behaviour disorder

Drug-induced parkinsonism has slightly different features to Parkinson's disease:

- motor symptoms are generally rapid onset and bilateral
- rigidity and rest tremor are uncommon



Question 80 of 128

Next

A mother brings her 9-year-old daughter into surgery. She has been having recurrent headaches. Which one of the following features of migraine is more common in children?



- ☐ A. Prolonged migraines (e.g. 24-48 hours)
- ☐ B. Strictly unilateral symptoms
- ☐ C. Hemiplegia
- ☐ D. Good response to metoclopramide
- ☒ E. Gastrointestinal disturbance



Next question

Nausea, vomiting and abdominal pain are common in children with migraine.

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none"> • 1. unilateral location* • 2. pulsating quality (i.e., varying with the heartbeat) • 3. moderate or severe pain intensity

Point	Criteria
	<ul style="list-style-type: none"> 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	<p>During headache at least one of the following:</p> <ul style="list-style-type: none"> 1. nausea and/or vomiting* 2. photophobia and phonophobia
E	<p>Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)</p>

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral
- NICE also give more detail about typical auras:

Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance

- decreased level of consciousness.



Question 81 of 128

Next

You are reviewing a patient who is suspected of having classical migraine (migraine with aura). Up to how long can an aura last before it is considered atypical and a potential 'red flag'?

<input type="radio"/>	A. 30 minutes
<input checked="" type="radio"/>	B. 1 hour
<input type="radio"/>	C. 2 hours
<input checked="" type="radio"/>	D. 3 hours
<input type="radio"/>	E. 6 hours

Next question

Headache: red flags

Headache is one of the most common presenting complaints seen in clinical practice. The vast majority of these will be caused by common, benign conditions. There are however certain features in a history which should prompt further action. In the 2012 guidelines NICE suggest the following:

- compromised immunity, caused, for example, by HIV or immunosuppressive drugs
- age under 20 years and a history of malignancy
- a history of malignancy known to metastasis to the brain
- vomiting without other obvious cause
- worsening headache with fever
- sudden-onset headache reaching maximum intensity within 5 minutes
- new-onset neurological deficit
- new-onset cognitive dysfunction
- change in personality
- impaired level of consciousness
- recent (typically within the past 3 months) head trauma

- headache triggered by cough, valsalva (trying to breathe out with nose and mouth blocked), sneeze or exercise
- orthostatic headache (headache that changes with posture)
- symptoms suggestive of giant cell arteritis or acute narrow-angle glaucoma
- a substantial change in the characteristics of their headache



Question 82 of 128

Next

A 39-year-old man is diagnosed as having cluster headaches. He has received subcutaneous sumatriptan on two occasions but would like to start medication to help prevent further attacks. Of the following options, which one is the most suitable treatment?

- | | |
|--|---------------------|
| <input type="radio"/> | A. Atenolol |
|  <input type="radio"/> | B. Amitriptyline |
| <input type="radio"/> | C. Sodium valproate |
|  <input checked="" type="radio"/> | D. Verapamil |
| <input type="radio"/> | E. Gabapentin |

Next question

The October 2009 AKT feedback report highlighted the pharmacological management of headache as an area causing difficulty for candidates.

Cluster headache

Cluster headaches* are more common in men (5:1) and smokers.

Features

- pain typical occurs once or twice a day, each episode lasting 15 mins - 2 hours
- clusters typically last 4-12 weeks
- intense pain around one eye (recurrent attacks 'always' affect same side)
- patient is restless during an attack
- accompanied by redness, lacrimation, lid swelling

- nasal stuffiness
- miosis and ptosis in a minority

Management

- acute: 100% oxygen, subcutaneous or a nasal triptan
- prophylaxis: verapamil, prednisolone
- NICE recommend seeking specialist advice from a neurologist if a patient develops cluster headaches with respect to neuroimaging

*some neurologists use the term trigeminal autonomic cephalgia to group a number of conditions including cluster headache, paroxysmal hemicrania and short-lived unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT). It is recommended such patients are referred for specialist assessment as specific treatment may be required, for example it is known paroxysmal hemicrania responds very well to indomethacin



Question 83 of 128

Next

You are reviewing a patient with Parkinson's disease. Which one of the following types of medications has been most linked with impulse control disorders?



<input type="radio"/>	A. Levodopa
<input type="radio"/>	B. Catechol-O-Methyl Transferase inhibitors
<input checked="" type="radio"/>	C. Dopamine receptor agonists
<input type="radio"/>	D. Amantadine
<input type="radio"/>	E. Monoamine Oxidase-B inhibitors

Next question

Currently accepted practice in the management of patients with Parkinson's disease (PD) is to delay treatment until the onset of disabling symptoms and then to introduce a dopamine receptor agonist. If the patient is elderly, levodopa is sometimes used as an initial treatment.

Dopamine receptor agonists

- e.g. Bromocriptine, ropinirole, cabergoline, apomorphine
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide*) have been associated with pulmonary, retroperitoneal and cardiac fibrosis. The Committee on Safety of Medicines advice that an echocardiogram, ESR, creatinine and chest x-ray should be obtained prior to treatment and patients should be closely monitored
- patients should be warned about the potential for dopamine receptor agonists to cause impulse control disorders and excessive daytime somnolence
- more likely than levodopa to cause hallucinations in older patients. Nasal congestion and postural hypotension are also seen in some patients

Levodopa

- usually combined with a decarboxylase inhibitor (e.g. carbidopa or benserazide) to prevent peripheral metabolism of levodopa to dopamine
- reduced effectiveness with time (usually by 2 years)
- unwanted effects: dyskinesia (involuntary writhing movements), 'on-off' effect, dry mouth, anorexia, palpitations, postural hypotension, psychosis, drowsiness
- no use in neuroleptic induced parkinsonism

MAO-B (Monoamine Oxidase-B) inhibitors

- e.g. Selegiline
- inhibits the breakdown of dopamine secreted by the dopaminergic neurons

Amantadine

- mechanism is not fully understood, probably increases dopamine release and inhibits its uptake at dopaminergic synapses
- side-effects include ataxia, slurred speech, confusion, dizziness and livedo reticularis

COMT (Catechol-O-Methyl Transferase) inhibitors

- e.g. Entacapone, tolcapone
- COMT is an enzyme involved in the breakdown of dopamine, and hence may be used as an adjunct to levodopa therapy
- used in conjunction with levodopa in patients with established PD

Antimuscarinics

- block cholinergic receptors
- now used more to treat drug-induced parkinsonism rather than idiopathic Parkinson's disease
- help tremor and rigidity
- e.g. procyclidine, benztropine, trihexyphenidyl (benzhexol)

*pergolide was withdrawn from the US market in March 2007 due to concern regarding increased incidence of valvular dysfunction



Question 84 of 128

Next

A 24-year-old man presents with worsening headaches. These are now occurring on a weekly basis and can last up to 12 hours. He describes an intense throbbing sensation on one side of his head which is usually preceded by an aura. Which one of the following features of the aura would be considered abnormal and may require further investigation?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Double vision |
| <input type="radio"/> | B. Duration of 30 minutes |
| <input type="radio"/> | C. Pins and needles sensation in one arm |
| <input checked="" type="radio"/> | D. Partial loss of vision |
| <input type="radio"/> | E. Speech disturbance |

Next question

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none">1. unilateral location*2. pulsating quality (i.e., varying with the heartbeat)3. moderate or severe pain intensity4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none">1. nausea and/or vomiting*2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral
- NICE also give more detail about typical auras:

Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance
- decreased level of consciousness.



Question 85 of 128

Next

A 39-year-old woman presents with sudden onset right-sided facial weakness. The weakness is consistent with a lower motor neuron palsy. She has no other neurological features on examination. Examination of her ears is also unremarkable. You make a presumptive diagnosis of Bell's palsy and prescribe a course of prednisolone. What is the most important next step in management?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Prescribe artificial tears and advise eye taping at night |
| <input type="radio"/> | B. Refer for neuroimaging |
| <input type="radio"/> | C. Prescribe aciclovir |
| <input type="radio"/> | D. Refer to plastic surgery to be seen within 2 weeks |
| <input type="radio"/> | E. Do a HIV test |

Next question

Bell's palsy may be defined as an acute, unilateral, idiopathic, facial nerve paralysis. The aetiology is unknown although the role of the herpes simplex virus has been investigated previously. The peak incidence is 20-40 years and the condition is more common in pregnant women.

Features

- lower motor neuron facial nerve palsy - forehead affected*
- patients may also notice post-auricular pain (may precede paralysis), altered taste, dry eyes, hyperacusis

Management

- in the past a variety of treatment options have been proposed including no treatment, prednisolone only and a combination of aciclovir and prednisolone
- following a National Institute for Health randomised controlled trial it is now recommended that prednisolone 1mg/kg for 10 days should be prescribed for patients within 72 hours of onset of Bell's palsy. Adding in aciclovir gives no additional benefit
- eye care is important - prescription of artificial tears and eye lubricants should be considered

Prognosis

- if untreated around 15% of patients have permanent moderate to severe weakness



*upper motor neuron lesion 'spares' upper face



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Next

A 61-year-old man complains of a four month history of neck and arm pain. The pain is described as being like 'electric shocks' and is worse when he turns his head. There is no history of trauma and no other obvious trigger. He is otherwise fit and well and takes no other medication. On examination he has decreased sensation on the dorsal aspect of the thumb and index finger. What is the most likely underlying diagnosis?

-  ☐ A. C4 radiculopathy
- ☐ B. C5 radiculopathy
-  ☒ C. C6 radiculopathy
- ☐ D. C7 radiculopathy
- ☐ E. T1 radiculopathy

Next question

Dermatomes

The table below lists the major dermatome landmarks:

Nerve root	Landmark	Mnemonics
C2	Posterior half of the skull (cap)	
C3	High turtleneck shirt	
C4	Low-collar shirt	
C5, C6	Thumb + index finger	Make a 6 with your left hand by touching the tip of the thumb & index finger together - C6
C7	Middle finger + palm of hand	
C8	Ring + little finger	
T4	Nipples	T4 at the Teat Pore
T5	Inframammary fold	
T7	Xiphoid process	
T10	Umbilicus	BellybuT-TEN

Nerve root	Landmark	Mnemonics
L1	Inguinal ligament	L for ligament, 1 for Inguinal
L4	Knee caps	Down on aLL fours - L4
L5	Big toe, dorsum of foot (except lateral aspect)	L5 = Largest of the 5 toes
S1	Lateral foot, small toe	S1 = the smallest one
S2, S3	Genitalia	



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Next

Which one of the following statements regarding epilepsy in pregnant women is correct?



- ☒ A. All pregnant women on antiepileptic medication should take 400mcg a day of folic acid
- ☐ B. Antiepileptic drug levels should be monitored throughout pregnancy
- ☐ C. The dose of lamotrigine usually needs to be decreased during pregnancy
- ☒ D. Pregnant women taking phenytoin should be given vitamin K in the last month of pregnancy
- ☐ E. Sodium valproate is most strongly associated with cleft palate

Next question

Epilepsy: pregnancy and breast feeding

The risks of uncontrolled epilepsy during pregnancy generally outweigh the risks of medication to the fetus. All women thinking about becoming pregnant should be advised to take folic acid 5mg per day well before pregnancy to minimise the risk of neural tube defects. Around 1-2% of newborns born to non-epileptic mothers have congenital defects. This rises to 3-4% if the mother takes antiepileptic medication.

Other points

- aim for monotherapy
- there is no indication to monitor antiepileptic drug levels
- sodium valproate: associated with neural tube defects
- carbamazepine: often considered the least teratogenic of the older antiepileptics
- phenytoin: associated with cleft palate
- lamotrigine: studies to date suggest the rate of congenital malformations may be low. The dose of lamotrigine may need to be increased in pregnancy

Breast feeding is generally considered safe for mothers taking antiepileptics with the possible exception of the barbiturates

It is advised that pregnant women taking phenytoin are given vitamin K in the last month of pregnancy to prevent clotting disorders in the newborn

Sodium valproate

The November 2013 issue of the Drug Safety Update also carried a warning about new evidence showing a significant risk of neurodevelopmental delay in children following maternal use of sodium valproate.



The update concludes that sodium valproate should not be used during pregnancy and in women of childbearing age unless clearly necessary. Women of childbearing age should not start treatment without specialist neurological or psychiatric advice.



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[Next](#)

What is the most common types of aura experience by patients with classical migraine?

-  ☐ A. Red desaturation + transient hemianopic disturbance
- ☐ B. Visual blurring + spreading scintillating scotoma
-  ☒ C. Spreading scintillating scotoma + transient hemianopic disturbance
- ☐ D. Flashing spots + 'kaleidoscope' effect
- ☐ E. Flashing spots + visual blurring

Next question

Migraine

Migraine is a common type of primary headache. It is characterised typically by:

- a severe, unilateral, throbbing headache
- associated with nausea, photophobia and phonophobia
- attacks may last up to 72 hours
- patients characteristically go to a darkened, quiet room during an attack
- 'classic' migraine attacks are precipitated by an aura. These occur in around one-third of migraine patients
- typical aura are visual, progressive, last 5-60 minutes and are characterised by transient hemianopic disturbance or a spreading scintillating scotoma
- formal diagnostic criteria are produced by the International Headache Society (see below)

Epidemiology

- 3 times more common in women
- prevalence in men is around 6%, in women 18%

Common triggers for a migraine attack

- tiredness, stress
- alcohol
- combined oral contraceptive pill
- lack of food or dehydration

- cheese, chocolate, red wines, citrus fruits
- menstruation
- bright lights

Migraine diagnostic criteria

A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none"> • 1. unilateral location* • 2. pulsating quality (i.e., varying with the heartbeat) • 3. moderate or severe pain intensity • 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none"> • 1. nausea and/or vomiting* • 2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.




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Next

Which one of the following factors indicates a poor prognosis in patients with multiple sclerosis?



- ☒ A. Relapsing-remitting disease
- ☐ B. Presence of sensory symptoms

<input type="radio"/>	C. Young age of onset
 <input checked="" type="radio"/>	D. Male sex
<input type="radio"/>	E. Long interval between first two relapses

Next question

Multiple sclerosis: prognostic features

Good prognosis features

- female sex
- young age of onset
- relapsing-remitting disease
- sensory symptoms
- long interval between first two relapses

Ways of remembering prognostic features



- the typical patient carries a better prognosis than an atypical presentation



Question 90 of 128

Next

Which one of the following statements regarding the use of triptans agonists in the treatment of migraine is incorrect?

 <input type="radio"/>	A. May be given subcutaneously
<input type="radio"/>	B. Are first-line therapy (in combination with NSAIDs/paracetamol) for the management of acute migraine
 <input checked="" type="radio"/>	C. Should be taken as soon as possible after the onset of an aura

- | | |
|-----------------------|---|
| <input type="radio"/> | D. Should be avoided in patients with ischaemic heart disease |
| <input type="radio"/> | E. Adverse effects include tingling and chest tightness |

Next question

Triptans

Triptans are specific 5-HT₁ agonists used in the acute treatment of migraine. They are generally used first-line in combination therapy with an NSAID or paracetamol.

Prescribing points

- should be taken as soon as possible after the onset of headache, rather than at onset of aura
- oral, orodispersible, nasal spray and subcutaneous injections are available

Adverse effects

- 'triptan sensations' - tingling, heat, tightness (e.g. throat and chest), heaviness, pressure

Contraindications

- patients with a history of, or significant risk factors for, ischaemic heart disease or cerebrovascular disease



Question 91 of 128

Next

A 45-year-old female with multiple sclerosis complains of tingling in her hands which comes on when she flexes her neck. What is this an example of?



- | | |
|-----------------------|---------------------------|
| <input type="radio"/> | A. Werdnig-Hoffman's sign |
|-----------------------|---------------------------|



<input checked="" type="radio"/>	B. Lhermitte's sign
<input type="radio"/>	C. Oppenheim's sign
<input type="radio"/>	D. Lambert's sign
<input type="radio"/>	E. Uhthoff's phenomenon

Next question

This is a classic description of Lhermitte's sign which indicates disease near the dorsal column nuclei of the cervical cord. It is also seen in subacute combined degeneration of the cord and in cervical stenosis

Multiple sclerosis: features

Patient's with multiple sclerosis (MS) may present with non-specific features, for example around 75% of patients have significant lethargy.

Visual

- optic neuritis: common presenting feature
- optic atrophy
- Uhthoff's phenomenon: worsening of vision following rise in body temperature
- internuclear ophthalmoplegia

Sensory

- pins/needles
- numbness
- trigeminal neuralgia
- Lhermitte's syndrome: paraesthesiae in limbs on neck flexion

Motor

- spastic weakness: most commonly seen in the legs

Cerebellar

- ataxia: more often seen during an acute relapse than as a presenting symptom
- tremor

Others

- urinary incontinence
- sexual dysfunction
- intellectual deterioration



Question 92 of 128

Next

A 34-year-old accountant presents with a one week history of pain around his right eye occurring once or twice a day. They are described as being very severe and lasting between 10-30 minutes each. He also describes a feeling of a blocked nose. What is the treatment of choice to treat this current episode?

<input type="radio"/>	A. Ibuprofen
<input checked="" type="radio"/>	B. Acetazolamide + topical pilocarpine
<input type="radio"/>	C. Prednisolone
<input checked="" type="radio"/>	D. Subcutaneous sumatriptan
<input type="radio"/>	E. Ergotamine

Next question

Cluster headache - acute treatment: subcutaneous sumatriptan + 100% O₂

Standard analgesia is rarely effective in cluster headaches. 100% oxygen may also be used.

The October 2009 AKT feedback report highlighted the pharmacological management of headache as an area causing difficulty for *Candidates*.

Cluster headache

Cluster headaches* are more common in men (5:1) and smokers.

Features

- pain typical occurs once or twice a day, each episode lasting 15 mins - 2 hours
- clusters typically last 4-12 weeks
- intense pain around one eye (recurrent attacks 'always' affect same side)
- patient is restless during an attack
- accompanied by redness, lacrimation, lid swelling
- nasal stuffiness
- miosis and ptosis in a minority

Management

- acute: 100% oxygen, subcutaneous or a nasal triptan
- prophylaxis: verapamil, prednisolone
- NICE recommend seeking specialist advice from a neurologist if a patient develops cluster headaches with respect to neuroimaging

*some neurologists use the term trigeminal autonomic cephalgia to group a number of conditions including cluster headache, paroxysmal hemicrania and short-lived unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT). It is recommended such patients are referred for specialist assessment as specific treatment may be required, for example it is known paroxysmal hemicrania responds very well to indomethacin



Question 93 of 128

Next

A 31-year-old woman presents with a 4 month history of headache. She has brought a headache diary which demonstrates that her symptoms are present on around 20-25 days of each month. The headache is typically unilateral and she is currently taking paracetamol 1g qds and ibuprofen 400mg tds everyday to try and relieve her symptoms. A diagnosis of medication overuse headache is suspected. What is the most appropriate management?



A. Add metoclopramide + start propranolol

- | | |
|------------------------------------|--|
| <input type="radio"/> | B. Gradually withdraw analgesics + start propranolol |
| ✓ <input checked="" type="radio"/> | C. Abruptly stop analgesics |
| <input type="radio"/> | D. Gradually withdraw analgesics |
| <input type="radio"/> | E. Continue analgesics + start propranolol |

Next question

Medication overuse headache

- simple analgesia + triptans: stop abruptly
- opioid analgesia: withdraw gradually

This answer may seem counterintuitive but it is line with recent guidelines from SIGN, please see the link provided.

Medication overuse headache

Medication overuse headache is one of the most common causes of chronic daily headache. It may affect up to 1 in 50 people

Features

- present for 15 days or more per month
- developed or worsened whilst taking regular symptomatic medication
- patients using opioids and triptans are at most risk
- may be psychiatric co-morbidity

Management (from 2008 SIGN guidelines)

- simple analgesics and triptans should be withdrawn abruptly (may initially worsen headaches)
- opioid analgesics should be gradually withdrawn



Question 94 of 128

Next

A 73-year-old woman presents with episodic confusion and headaches for the past week. She has a history of alcohol excess and a background of atrial fibrillation and type 2 diabetes mellitus. Her daughter reports that she has been having frequent spells of confusion over the past few days. Last year she was assessed for frequent falls. Her current medications include bisoprolol, metformin and warfarin. Neurological examination is unremarkable and her blood sugar is 6.7 mmol/l. What is the most likely diagnosis?



- | | |
|----------------------------------|------------------------------|
| <input type="radio"/> | A. Korsakoff's syndrome |
| <input type="radio"/> | B. Wernicke's encephalopathy |
| <input type="radio"/> | C. Extradural haematoma |
| <input type="radio"/> | D. Subarachnoid haemorrhage |
| <input checked="" type="radio"/> | E. Subdural haematoma |



Next question

Fluctuating confusion/consciousness? - subdural haematoma

This patient has a number of risk factors for a subdural haematoma including old age, alcoholism and anticoagulation. Korsakoff's syndrome and Wernicke's encephalopathy do not usually cause headaches.

Head injury: types of traumatic brain injury

Basics

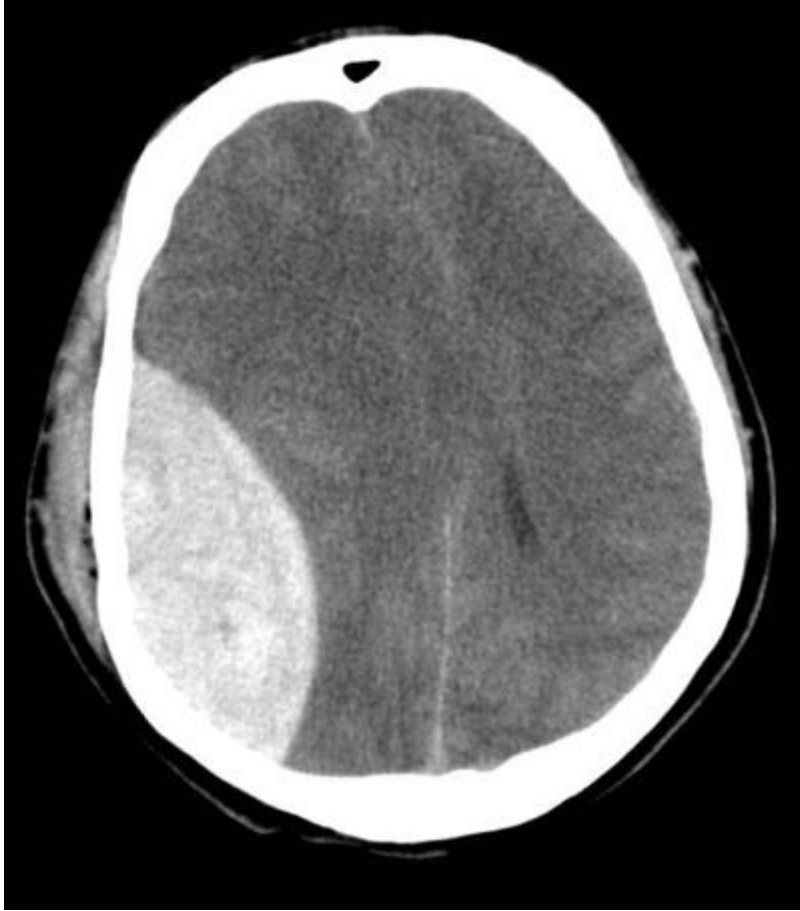
- primary brain injury may be focal (contusion/haematoma) or diffuse (diffuse axonal injury)
- diffuse axonal injury occurs as a result of mechanical shearing following deceleration, causing disruption and tearing of axons
- intra-cranial haematomas can be extradural, subdural or intracerebral, while contusions may occur adjacent to (coup) or contralateral (contre-coup) to the side of impact

- secondary brain injury occurs when cerebral oedema, ischaemia, infection, tonsillar or tentorial herniation exacerbates the original injury. The normal cerebral auto regulatory processes are disrupted following trauma rendering the brain more susceptible to blood flow changes and hypoxia
- the Cushings reflex (hypertension and bradycardia) often occurs late and is usually a pre terminal event

Type of injury	Notes
Extradural (epidural) haematoma	<p>Bleeding into the space between the dura mater and the skull. Often results from acceleration-deceleration trauma or a blow to the side of the head. The majority of epidural haematomas occur in the temporal region where skull fractures cause a rupture of the middle meningeal artery.</p> <p>Features</p> <ul style="list-style-type: none"> • features of raised intracranial pressure • some patients may exhibit a lucid interval
Subdural haematoma	<p>Bleeding into the outermost meningeal layer. Most commonly occur around the frontal and parietal lobes.</p> <p>Risk factors include old age, alcoholism and anticoagulation.</p> <p>Slower onset of symptoms than a epidural haematoma.</p>
Subarachnoid haemorrhage	<p>Usually occurs spontaneously in the context of a ruptured cerebral aneurysm but may be seen in association with other injuries when a patient has sustained a traumatic brain injury</p>

Image gallery

Extradural (epidural) haematoma:



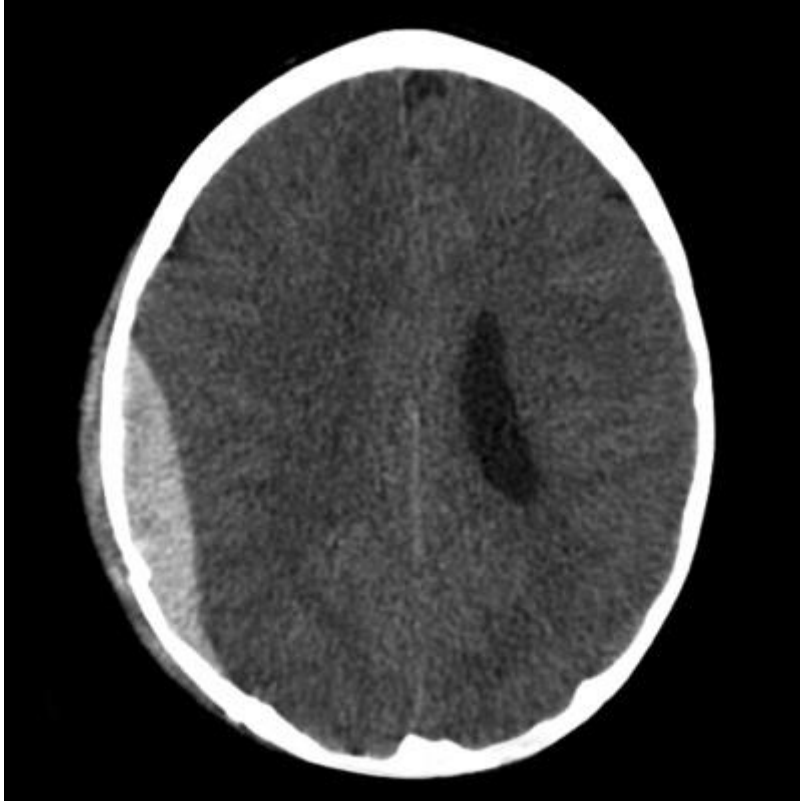
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Subdural haematoma:



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Subarachnoid haemorrhage:



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Next

A 49-year-old presents with hot flushes and irregular periods. She has a past history of migraine and is keen for hormone replacement therapy (HRT). What is the most appropriate management?



☐ A. HRT is contraindicated



☒ B. HRT can be given but may worsen migraine

<input type="radio"/>	C. HRT can only be given if the women has not a migraine in the past 12 months
<input type="radio"/>	D. Tell the patient HRT does not affect migraine
<input type="radio"/>	E. Suggest a progestogen only formula

[Next question](#)

Migraine: pregnancy, contraception and other hormonal factors

SIGN produced guidelines in 2008 on the management of migraine, the following is selected highlights:

Migraine during pregnancy

- paracetamol 1g is first-line
- aspirin 300mg or ibuprofen 400mg can be used second-line in the first and second trimester

Migraine and the combined oral contraceptive (COC) pill

- if patients have migraine with aura then the COC is absolutely contraindicated due to an increased risk of stroke (relative risk 8.72)

Migraine and menstruation

- many women find that the frequency and severity of migraines increase around the time of menstruation
- SIGN recommends that women are treated with mefenamic acid or a combination of aspirin, paracetamol and caffeine. Triptans are also recommended in the acute situation

Migraine and hormone replacement therapy (HRT)

- safe to prescribe HRT for patients with a history of migraine but it may make migraines worse



Question 96 of 128

Next

You review a 60-year-old patient who is known to have chronic obstructive pulmonary disease and epilepsy. Her seizure control has recently worsened. Which one of the following drugs is most likely to worsen seizure control?



- | | |
|----------------------------------|-------------------------|
| <input type="radio"/> | A. Tiotropium (inhaled) |
| <input type="radio"/> | B. Sertraline |
| <input type="radio"/> | C. Clarithromycin |
| <input type="radio"/> | D. Carbocisteine |
| <input checked="" type="radio"/> | E. Aminophylline |

Next question

Prescribing in patients with epilepsy

The following drugs may worsen seizure control in patients with epilepsy:

- alcohol, cocaine, amphetamines
- ciprofloxacin, levofloxacin
- aminophylline, theophylline
- bupropion
- methylphenidate (used in ADHD)

Some medications such as benzodiazepines, baclofen and hydroxyzine may provoke seizures whilst they are being withdrawn.

Other medications may worsen seizure control by interfering with the metabolism of anti-epileptic drugs (i.e. P450 inducers/inhibitors).



Question 97 of 128

Next

A 63-year-old female is reviewed in the rapid access transient ischaemic attack clinic. For the past three weeks she has been having episodes of transient loss of vision in the right eye. Carotid ultrasound reveals a 48% stenosis of her right carotid artery and an ECG shows sinus rhythm. She was started on aspirin 300mg od by her own GP after the first episode. What is the most appropriate management of this patient?

- ☐ A. Warfarin
- ☒ B. Clopidogrel
- ☐ C. Carotid endarterectomy
- ☐ D. Aspirin
- ☐ E. Aspirin and dipyridamole

Next question

Antiplatelets

- TIA: clopidogrel
- ischaemic stroke: clopidogrel

Carotid artery endarterectomy is recommend if the patient has suffered a stroke or TIA in the carotid territory and is not severely disabled. It should only be considered if the carotid stenosis is greater than 70% or 50%, depending on the reporting criteria used - please see below.

The 2012 Royal College of Physicians National clinical guidelines for stroke now recommend using clopidogrel following a TIA. This brings it in line with current stroke guidance.

Transient ischaemic attack

NICE issued updated guidelines relating to stroke and transient ischaemic attack (TIA) in 2008. They advocated the use of the ABCD2 prognostic score for risk stratifying patients who've had a suspected TIA:

Criteria	Points
----------	--------

	Criteria	Points
A	Age \geq 60 years	1
B	Blood pressure \geq 140/90 mmHg	1
C	Clinical features	
	- Unilateral weakness	2
	- Speech disturbance, no weakness	1
D	Duration of symptoms	
	- > 60 minutes	2
	- 10-59 minutes	1
	Patient has diabetes	1

This gives a total score ranging from 0 to 7. People who have had a suspected TIA who are at a higher risk of stroke (that is, with an ABCD2 score of 4 or above) should have:

- aspirin (300 mg daily) started immediately
- specialist assessment and investigation within 24 hours of onset of symptoms
- measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors

If the ABCD2 risk score is 3 or below:

- specialist assessment within 1 week of symptom onset, including decision on brain imaging
- if vascular territory or pathology is uncertain, refer for brain imaging

People with crescendo TIAs (two or more episodes in a week) should be treated as being at high risk of stroke, even though they may have an ABCD2 score of 3 or below.

Antithrombotic therapy

- clopidogrel is recommended first-line (as for patients who've had a stroke)
- aspirin + dipyridamole should be given to patients who cannot tolerate clopidogrel
- these recommendations follow the 2012 Royal College of Physicians National clinical guideline for stroke. Please see the link for more details (section 5.5)
- these guidelines may change following the CHANCE study (NEJM 2013;369:11). This study looked at giving high-risk TIA patients aspirin + clopidogrel for the first 90 days compared to

aspirin alone. 11.7% of aspirin only patients had a stroke over 90 days compared to 8.2% of dual antiplatelet patients

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST* criteria or > 50% according to NASCET** criteria

*European Carotid Surgery Trialists' Collaborative Group

**North American Symptomatic Carotid Endarterectomy Trial

2 / 3 **Question 98-100 of 128**

[Next](#)

Theme: Causes of headache

A.	Temporal arteritis
B.	Sinusitis
C.	Tension headache
D.	Cluster headache
E.	Acute glaucoma
F.	Migraine
G.	Subarachnoid haemorrhage
H.	Raised intracranial pressure
I.	Medication overuse headache
J.	Meningitis

For each one of the following clinical scenarios select the most likely diagnosis:

98. A 22-year-old man presents with a one day history of a generalised headache. He prefers being in the dark and says he is 'sleepy'. He has no neck stiffness. His temperature is 37.9°C

 You answered Migraine

The correct answer is Meningitis


Neck stiffness is absent in around 30% of patients with meningitis.

Migraine would not explain his pyrexia.

99. A 69-year-old woman presents with a 3 week history of a headache which is worse on the right side. She is generally unwell and feels 'weak'

 Temporal arteritis

100. A 33-year-old woman presents due to a severe frontal headache. She developed a cold around 2 weeks ago but has now been left with a severe headache. The pain is worse when she bends forward

 Sinusitis

[Next question](#)

Headache

Headache accounts for a large proportion of medical consultations. The table below summarises the main characteristics of common or important causes:

Migraine	Recurrent, severe headache which is usually unilateral and throbbing in nature May be associated with aura, nausea and photosensitivity Aggravated by, or causes avoidance of, routine activities of daily living. Patients often describe 'going to bed'. In women may be associated with menstruation
Tension headache	Recurrent, non-disabling, bilateral headache, often described as a 'tight-band' Not aggravated by routine activities of daily living

Migraine	Recurrent, severe headache which is usually unilateral and throbbing in nature May be associated with aura, nausea and photosensitivity Aggravated by, or causes avoidance of, routine activities of daily living. Patients often describe 'going to bed'. In women may be associated with menstruation
Cluster headache*	Pain typical occurs once or twice a day, each episode lasting 15 mins - 2 hours with clusters typically lasting 4-12 weeks Intense pain around one eye (recurrent attacks 'always' affect same side) Patient is restless during an attack Accompanied by redness, lacrimation, lid swelling More common in men and smokers
Temporal arteritis	Typically patient > 60 years old Usually rapid onset (e.g. < 1 month) of unilateral headache Jaw claudication (65%) Tender, palpable temporal artery Raised ESR
Medication overuse headache	Present for 15 days or more per month Developed or worsened whilst taking regular symptomatic medication Patients using opioids and triptans are at most risk May be psychiatric co-morbidity

Other causes of headache

Acute single episode

- meningitis
- encephalitis
- subarachnoid haemorrhage
- head injury
- sinusitis
- glaucoma (acute closed-angle)
- tropical illness e.g. Malaria

Chronic headache

- chronically raised ICP
- Paget's disease
- psychological

*some neurologists use the term trigeminal autonomic cephalgia to group a number of conditions including cluster headache, paroxysmal hemicrania and short-lived unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT). It is recommended such patients are referred for specialist assessment as specific treatment may be required, for example it is known paroxysmal hemicrania responds very well to indomethacin



Question 101 of 128

Next

Which one of the following do NICE advocate as being useful in the prophylaxis against migraine?



<input type="radio"/>	A. Thiamine
<input type="radio"/>	B. Vitamin C
<input checked="" type="radio"/>	C. Riboflavin
<input type="radio"/>	D. St John's Wort
<input type="radio"/>	E. Vitamin B6

Next question

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan

- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 102 of 128

Next

A 14-year-old girl is taken to the Emergency Department, after being found lying on her bed next to an empty bottle of pills prescribed for her mother. On examination she is agitated, has a clenched jaw and her eyes are deviated upwards. Which drug is she most likely to have consumed?



A. Phenytoin



B. Metoclopramide



C. Amitriptyline

- | | |
|-----------------------|------------------|
| <input type="radio"/> | D. Carbamazepine |
| <input type="radio"/> | E. Nifedipine |

[Next question](#)

This is a classic description of an oculogyric crisis, a form of extrapyramidal disorder

Oculogyric crisis

An oculogyric crisis is a dystonic reaction to certain drugs or medical conditions

Features

- restlessness, agitation
- involuntary upward deviation of the eyes

Causes

- phenothiazines
- haloperidol
- metoclopramide
- postencephalitic Parkinson's disease

Management

- procyclidine



Question 103 of 128

[Next](#)

Which one of the following dopamine receptor agonists used in the management of Parkinson's disease is least associated with pulmonary, retroperitoneal and pericardial fibrosis?

- | | |
|-----------------------|--------------|
| <input type="radio"/> | A. Pergolide |
|-----------------------|--------------|

<input type="radio"/>	B. Lisuride
 <input type="radio"/>	C. Bromocriptine
<input type="radio"/>	D. Cabergoline
 <input type="radio"/>	E. Ropinirole

Next question

Parkinson's disease: management

Currently accepted practice in the management of patients with Parkinson's disease (PD) is to delay treatment until the onset of disabling symptoms and then to introduce a dopamine receptor agonist. If the patient is elderly, levodopa is sometimes used as an initial treatment.

Dopamine receptor agonists

- e.g. Bromocriptine, ropinirole, cabergoline, apomorphine
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide*) have been associated with pulmonary, retroperitoneal and cardiac fibrosis. The Committee on Safety of Medicines advice that an echocardiogram, ESR, creatinine and chest x-ray should be obtained prior to treatment and patients should be closely monitored
- patients should be warned about the potential for dopamine receptor agonists to cause impulse control disorders and excessive daytime somnolence
- more likely than levodopa to cause hallucinations in older patients. Nasal congestion and postural hypotension are also seen in some patients

Levodopa

- usually combined with a decarboxylase inhibitor (e.g. carbidopa or benserazide) to prevent peripheral metabolism of levodopa to dopamine
- reduced effectiveness with time (usually by 2 years)
- unwanted effects: dyskinesia (involuntary writhing movements), 'on-off' effect, dry mouth, anorexia, palpitations, postural hypotension, psychosis, drowsiness
- no use in neuroleptic induced parkinsonism

MAO-B (Monoamine Oxidase-B) inhibitors

- e.g. Selegiline
- inhibits the breakdown of dopamine secreted by the dopaminergic neurons

Amantadine

- mechanism is not fully understood, probably increases dopamine release and inhibits its uptake at dopaminergic synapses
- side-effects include ataxia, slurred speech, confusion, dizziness and livedo reticularis

COMT (Catechol-O-Methyl Transferase) inhibitors

- e.g. Entacapone, tolcapone
- COMT is an enzyme involved in the breakdown of dopamine, and hence may be used as an adjunct to levodopa therapy
- used in conjunction with levodopa in patients with established PD

Antimuscarinics

- block cholinergic receptors
- now used more to treat drug-induced parkinsonism rather than idiopathic Parkinson's disease
- help tremor and rigidity
- e.g. procyclidine, benzotropine, trihexyphenidyl (benzhexol)

*pergolide was withdrawn from the US market in March 2007 due to concern regarding increased incidence of valvular dysfunction



Question 104 of 128

Next

You are reviewing a 30-year-old man who experiencing frequent migraine-type headaches. At what point should consideration be given to prescribing migraine prophylaxis?

- | | | |
|----------------------------------|----|------------------------------------|
| <input type="radio"/> | A. | 1 or more migraines every 2 months |
| <input type="radio"/> | B. | 1 or more migraines every month |
| <input checked="" type="radio"/> | C. | 2 or more migraines every month |
| <input type="radio"/> | D. | 3 or more migraines every month |
| <input type="radio"/> | E. | 4 or more migraines every month |

Next question

Consider migraine prophylaxis if a patient is having 2 or more migraines a month

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives

- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 105 of 128

Next

Neuropathic pain characteristically responds poorly to opioids. However, if standard treatment options have failed which opioid is it most appropriate to consider starting?



- | | |
|----------------------------------|------------------|
| <input checked="" type="radio"/> | A. Tramadol |
| <input type="radio"/> | B. Morphine |
| <input type="radio"/> | C. Codeine |
| <input type="radio"/> | D. Oxycodone |
| <input type="radio"/> | E. Buprenorphine |



Next question

Neuropathic pain

Neuropathic pain may be defined as pain which arises following damage or disruption of the nervous system. It is often difficult to treat and responds poorly to standard analgesia.

Examples include:

- diabetic neuropathy
- post-herpetic neuralgia
- trigeminal neuralgia
- prolapsed intervertebral disc

NICE updated their guidance on the management of neuropathic pain in 2013:

- first-line treatment*: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

*please note that for some specific conditions the guidance may vary. For example carbamazepine is used first-line for trigeminal neuralgia



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Next

A 67-year-old man who has a history of type 2 diabetes mellitus and benign prostatic hypertrophy presents with burning pain in his feet. This has been present for the past few months and is getting gradually worse. He has tried taking duloxetine but unfortunately has received no benefit. Clinical examination is unremarkable other than diminished sensation to fine touch on both soles. What is the most suitable initial management?

<input type="radio"/>	A. Carbamazepine
<input type="radio"/>	B. Amitriptyline
<input checked="" type="radio"/>	C. Pregabalin
<input type="radio"/>	D. Fluoxetine



E. Sodium valproate

Next question

Amitriptyline would normally be first choice but given his history of benign prostatic hyperplasia it is better to avoid amitriptyline due to the risk of urinary retention.

Diabetic neuropathy

NICE updated its guidance on the management of neuropathic pain in 2013. Diabetic neuropathy is now managed in the same way as other forms of neuropathic pain:

- first-line treatment: amitriptyline, duloxetine, gabapentin or pregabalin
- if the first-line drug treatment does not work try one of the other 3 drugs
- tramadol may be used as 'rescue therapy' for exacerbations of neuropathic pain
- topical capsaicin may be used for localised neuropathic pain (e.g. post-herpetic neuralgia)
- pain management clinics may be useful in patients with resistant problems

Gastroparesis

- symptoms include erratic blood glucose control, bloating and vomiting
- management options include metoclopramide, domperidone or erythromycin (prokinetic agents)



Question 107 of 128

Next

A 65-year-old man who has recently been diagnosed with Parkinson's disease comes for review. He has been prescribed Sinemet (co-careldopa) by his neurologist. Unfortunately he is significantly troubled by nausea. What is the most appropriate anti-emetic to prescribe?



A. Metoclopramide



B. Haloperidol



C. Domperidone

<input type="radio"/>	D. Prochlorperazine
<input type="radio"/>	E. Cyclizine

Next question

Cyclizine is an antihistamine which, like prochlorperazine, may exacerbate Parkinson's disease.

Parkinsonism

Causes of Parkinsonism

- Parkinson's disease
- drug-induced e.g. antipsychotics, metoclopramide - see below
- progressive supranuclear palsy
- multiple system atrophy
- Wilson's disease
- post-encephalitis
- dementia pugilistica (secondary to chronic head trauma e.g. boxing)
- toxins: carbon monoxide, MPTP

Drugs causing Parkinsonism

- phenothiazines: e.g. chlorpromazine, prochlorperazine
- butyrophenones: haloperidol, droperidol
- metoclopramide

Domperidone does not cross the blood-brain barrier and therefore does not cause extra-pyramidal side-effects



Question 108 of 128

Next

Which one of the following statements regarding migraines is correct?



<input type="radio"/>	A. Prokinetic agents should be used in children with migraine due to the high incidence of gastrointestinal symptoms
-----------------------	--

- ✓ ☒ **B.** Typical aura include a spreading scintillating scotoma ('jagged crescent')
- ☐ **C.** Bilateral symptoms are rare in children
- ☐ **D.** Adults with migraine are typically able to carry on with their daily lives
- ☐ **E.** Aura occur in around 50% of patients

Next question

Prokinetic agents such as metoclopramide should be used with caution in children.

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none"> 1. unilateral location* 2. pulsating quality (i.e., varying with the heartbeat) 3. moderate or severe pain intensity 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none"> 1. nausea and/or vomiting* 2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and

gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral
- NICE also give more detail about typical auras:

Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance
- decreased level of consciousness.



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Next

You are reviewing a 31-year-old woman who is experiencing migraine-like headaches without any associated aura. Approximately, what percentage of patients with migraine experience aura?



A. 10%



B. 25%

- ☐ C. 40%
- ☐ D. 55%
- ☐ E. 70%

[Next question](#)

Around 25% of migraine patients experience aura

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none"> 1. unilateral location* 2. pulsating quality (i.e., varying with the heartbeat) 3. moderate or severe pain intensity 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none"> 1. nausea and/or vomiting* 2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral
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Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance
- decreased level of consciousness.



Question 110 of 128

Next

A 27-year-old woman is reviewed due to sudden loss of vision in her left eye. She is known to have severe rheumatoid arthritis and is currently treated with methotrexate, infliximab and prednisolone. For the past 6 weeks she has developed troublesome headaches. Examination demonstrates bilateral papilloedema. A diagnosis of intracranial hypertension is suspected. Which one of the following is most likely to have caused the intracranial hypertension?

	<input type="radio"/>	A. Acute angle-closure glaucoma
	<input checked="" type="radio"/>	B. Prednisolone
	<input type="radio"/>	C. Infliximab
	<input type="radio"/>	D. Methotrexate
	<input type="radio"/>	E. Keratoconjunctivitis sicca

Next question

This patient has developed intracranial hypertension probably secondary to prednisolone. Patients may lose sight suddenly if the optic nerve becomes compressed

Idiopathic intracranial hypertension

Idiopathic intracranial hypertension (also known as pseudotumour cerebri and formerly benign intracranial hypertension) is a condition classically seen in young, overweight females.

Features

- headache
- blurred vision
- papilloedema (usually present)
- enlarged blind spot
- sixth nerve palsy may be present

Risk factors

- obesity
- female sex
- pregnancy
- drugs*: oral contraceptive pill, steroids, tetracycline, vitamin A

Management

- weight loss
- diuretics e.g. acetazolamide

- repeated lumbar puncture
- surgery: optic nerve sheath decompression and fenestration may be needed to prevent damage to the optic nerve. A lumboperitoneal or ventriculoperitoneal shunt may also be performed to reduce intracranial pressure

*if intracranial hypertension is thought to occur secondary to a known causes (e.g. Medication) then it is of course not idiopathic



Question 111 of 128

Next

Which one of the following drugs is used in the management of multiple sclerosis?



- | | |
|----------------------------------|---------------------|
| <input checked="" type="radio"/> | A. Beta-interferon |
| <input type="radio"/> | B. Gamma-interferon |
| <input type="radio"/> | C. Infliximab |
| <input type="radio"/> | D. Rituximab |
| <input type="radio"/> | E. Alpha-interferon |



Next question

Multiple sclerosis: management

Treatment in multiple sclerosis is focused at reducing the frequency and duration of relapses. There is no cure.

Acute relapse

High dose steroids (e.g. IV methylprednisolone) may be given for 3-5 days to shorten the length of an acute relapse. It should be noted that steroids shorten the duration of a relapse and do not alter the degree of recovery (i.e. whether a patient returns to baseline function)

Disease modifying drugs

Beta-interferon has been shown to reduce the relapse rate by up to 30%. Certain criteria have to be met before it is used:

- relapsing-remitting disease + 2 relapses in past 2 years + able to walk 100m unaided
- secondary progressive disease + 2 relapses in past 2 years + able to walk 10m (aided or unaided)
- reduces number of relapses and MRI changes, however doesn't reduce overall disability

Other drugs used in the management of multiple sclerosis include:

- glatiramer acetate: immunomodulating drug - acts as an 'immune decoy'
- natalizumab: a recombinant monoclonal antibody that antagonises Alpha-4 Beta-1-integrin found on the surface of leucocytes, thus inhibiting migration of leucocytes across the endothelium across the blood-brain barrier
- fingolimod: sphingosine 1-phosphate receptor modulator, prevents lymphocytes from leaving lymph nodes. An oral formulation is available

Some specific problems

Spasticity

- baclofen and gabapentin are first-line. Other options include diazepam, dantrolene and tizanidine
- physiotherapy is important
- cannabis and botox are undergoing evaluation

Bladder dysfunction

- may take the form of urgency, incontinence, overflow etc
- guidelines stress the importance of getting an ultrasound first to assess bladder emptying - anticholinergics may worsen symptoms in some patients
- if significant residual volume → intermittent self-catheterisation
- if no significant residual volume → anticholinergics may improve urinary frequency



Question 112 of 128

Next

A 71-year-old man is reviewed following an ischaemic stroke. He is known to be intolerant of clopidogrel. What is the most appropriate therapy to help reduce his chance of having a further stroke?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Aspirin + dipyridamole. Stop dipyridamole after 2 years |
| <input type="radio"/> | B. Dipyridamole. Stop dipyridamole after 2 years |
| <input type="radio"/> | C. Aspirin lifelong |
| <input type="radio"/> | D. Warfarin |
| <input checked="" type="radio"/> | E. Aspirin + dipyridamole lifelong |

Next question

Please see the 2010 NICE guidelines for more details. The 2-year limit has now been removed.

Stroke: management

The Royal College of Physicians (RCP) published guidelines on the diagnosis and management of patients following a stroke in 2004. NICE also issued stroke guidelines in 2008, although they modified their guidance with respect to antiplatelet therapy in 2010.

Selected points relating to the management of acute stroke include:

- blood glucose, hydration, oxygen saturation and temperature should be maintained within normal limits
- blood pressure should not be lowered in the acute phase unless there are complications e.g. Hypertensive encephalopathy*
- aspirin 300mg orally or rectally should be given as soon as possible if a haemorrhagic stroke has been excluded
- with regards to atrial fibrillation, the RCP state: 'anticoagulants should not be started until brain imaging has excluded haemorrhage, and usually not until 14 days have passed from the onset of an ischaemic stroke'

- if the cholesterol is > 3.5 mmol/l patients should be commenced on a statin. Many physicians will delay treatment until after at least 48 hours due to the risk of haemorrhagic transformation

Thrombolysis

Thrombolysis should only be given if:

- it is administered within 4.5 hours of onset of stroke symptoms (unless as part of a clinical trial)
- haemorrhage has been definitively excluded (i.e. Imaging has been performed)

Alteplase is currently recommended by NICE.

Contraindications to thrombolysis:

Absolute	Relative
<ul style="list-style-type: none"> - Previous intracranial haemorrhage - Seizure at onset of stroke - Intracranial neoplasm - Suspected subarachnoid haemorrhage - Stroke or traumatic brain injury in preceding 3 months - Lumbar puncture in preceding 7 days - Gastrointestinal haemorrhage in preceding 3 weeks - Active bleeding - Pregnancy - Oesophageal varices - Uncontrolled hypertension >200/120mmHg 	<ul style="list-style-type: none"> - Concurrent anticoagulation (INR >1.7) - Haemorrhagic diathesis - Active diabetic haemorrhagic retinopathy - Suspected intracardiac thrombus - Major surgery / trauma in preceding 2 weeks

Secondary prevention

NICE also published a technology appraisal in 2010 on the use of clopidogrel and dipyridamole

Recommendations from NICE include:

- clopidogrel is now recommended by NICE ahead of combination use of aspirin plus modified release (MR) dipyridamole in people who have had an ischaemic stroke

- aspirin plus MR dipyridamole is now recommended after an ischaemic stroke only if clopidogrel is contraindicated or not tolerated, but treatment is no longer limited to 2 years' duration
- MR dipyridamole alone is recommended after an ischaemic stroke only if aspirin or clopidogrel are contraindicated or not tolerated, again with no limit on duration of treatment

With regards to carotid artery endarterectomy:

- recommend if patient has suffered stroke or TIA in the carotid territory and are not severely disabled
- should only be considered if carotid stenosis > 70% according ECST** criteria or > 50% according to NASCET*** criteria

*the 2009 Controlling hypertension and hypotension immediately post-stroke (CHHIPS) trial may change thinking on this but guidelines have yet to change to reflect this

**European Carotid Surgery Trialists' Collaborative Group

***North American Symptomatic Carotid Endarterectomy Trial



Question 113 of 128

Next

Which one of the following is least recognised as an adverse effect of phenytoin use?



<input type="radio"/>	A. Megaloblastic anaemia
<input type="radio"/>	B. Peripheral neuropathy
<input checked="" type="radio"/>	C. Alopecia
<input type="radio"/>	D. Osteomalacia
<input type="radio"/>	E. Coarsening of facial features

Next question

Phenytoin is associated with hirsutism, rather than alopecia

Phenytoin

Phenytoin is used to in the management of seizures.

Mechanism of action

- sodium channel blocker, decreasing the sodium influx into neurons which in turn decreases excitability

Phenytoin is associated with a large number of adverse effects. These may be divided into acute, chronic, idiosyncratic and teratogenic

Acute

- initially: dizziness, diplopia, nystagmus, slurred speech, ataxia
- later: confusion, seizures

Chronic

- common: gingival hyperplasia (secondary to increased expression of platelet derived growth factor, PDGF), hirsutism, coarsening of facial features, drowsiness
- megaloblastic anaemia (secondary to altered folate metabolism)
- peripheral neuropathy
- enhanced vitamin D metabolism causing osteomalacia
- lymphadenopathy
- dyskinesia

Idiosyncratic

- fever
- rashes, including severe reactions such as toxic epidermal necrolysis
- hepatitis
- Dupuytren's contracture*
- aplastic anaemia
- drug-induced lupus

Teratogenic

- associated with cleft palate and congenital heart disease

**Question 114 of 128**[Next](#)

You review a 26-year-old woman who suffers from severe, unilateral, throbbing headaches. These happen around once a month but are not linked to her menstrual cycle. She occasionally gets brief 'zig-zags in front of my eyes' before the headache starts. She has no particular preference for treatment and asks for your advice on the best way to treat acute attacks. Of the given options, what is the most appropriate first-line treatment?



- | | |
|----------------------------------|----------------------------------|
| <input checked="" type="radio"/> | A. Oral triptan + oral NSAID |
| <input type="radio"/> | B. Oral NSAID |
| <input type="radio"/> | C. Oral paracetamol |
| <input type="radio"/> | D. Oral paracetamol + oral NSAID |
| <input type="radio"/> | E. Oral triptan |

[Next question](#)

NICE recommend combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol, for the acute treatment of migraine

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 115 of 128

Next

A 24-year-old woman presents for advice. Over the past few months she has been having increasing problems with migraine around the time of menstruation. Her current migraine started around 24 hours ago and has not responded to a combination of paracetamol and aspirin. What is the most appropriate next step to relieve her headache?



- | | |
|----------------------------------|----------------|
| <input type="radio"/> | A. Codeine |
| <input type="radio"/> | B. Ergotamine |
| <input checked="" type="radio"/> | C. Sumatriptan |
| <input type="radio"/> | D. Venlafaxine |



E. Norethisterone

[Next question](#)

Oral mefenamic acid would also be a suitable alternative.

The October 2009 AKT feedback report highlighted the pharmacological management of headache as an area causing difficulty for candidates.

Migraine: pregnancy, contraception and other hormonal factors

SIGN produced guidelines in 2008 on the management of migraine, the following is selected highlights:

Migraine during pregnancy

- paracetamol 1g is first-line
- aspirin 300mg or ibuprofen 400mg can be used second-line in the first and second trimester

Migraine and the combined oral contraceptive (COC) pill

- if patients have migraine with aura then the COC is absolutely contraindicated due to an increased risk of stroke (relative risk 8.72)

Migraine and menstruation

- many women find that the frequency and severity of migraines increase around the time of menstruation
- SIGN recommends that women are treated with mefenamic acid or a combination of aspirin, paracetamol and caffeine. Triptans are also recommended in the acute situation

Migraine and hormone replacement therapy (HRT)

- safe to prescribe HRT for patients with a history of migraine but it may make migraines worse



Question 116 of 128

Next

A 67-year-old woman comes for review with her husband. Her husband complains that she is constantly getting up from bed at night and pacing around the bedroom. She complains of 'antsy' legs and a 'horrible, creeping sensation'. Her symptoms generally come on in the evening and are only relieved by moving round. Given the likely diagnosis, what is the most appropriate treatment?



- | | |
|----------------------------------|------------------|
| <input type="radio"/> | A. Amitriptyline |
| <input type="radio"/> | B. Citalopram |
| <input checked="" type="radio"/> | C. Ropinirole |
| <input type="radio"/> | D. Quinine |
| <input type="radio"/> | E. Carbamazepine |

Next question

Restless leg syndrome - management includes dopamine agonists such as ropinirole

Restless legs syndrome

Restless legs syndrome (RLS) is a syndrome of spontaneous, continuous lower limb movements that may be associated with paraesthesia. It is extremely common, affecting between 2-10% of the general population. Males and females are equally affected and a family history may be present

Clinical features

- uncontrollable urge to move legs (akathisia). Symptoms initially occur at night but as condition progresses may occur during the day. Symptoms are worse at rest
- paraesthesias e.g. 'crawling' or 'throbbing' sensations
- movements during sleep may be noted by the partner - periodic limb movements of sleeps (PLMS)

Causes and associations

- there is a positive family history in 50% of patients with idiopathic RLS
- iron deficiency anaemia
- uraemia
- diabetes mellitus
- pregnancy

The diagnosis is clinical although bloods to exclude iron deficiency anaemia may be appropriate

Management

- simple measures: walking, stretching, massaging affected limbs
- treat any iron deficiency
- dopamine agonists are first-line treatment (e.g. Pramipexole, ropinirole)
- benzodiazepines
- gabapentin



Question 117 of 128

Next

You are reviewing a woman who has presented with unilateral facial weakness of acute onset. Which one of the following is the strongest risk factor for developing a Bell's palsy?

<input type="radio"/>	A. Sarcoidosis
<input checked="" type="radio"/>	B. Pregnancy
<input type="radio"/>	C. Combined oral contraceptive use
<input type="radio"/>	D. Asthma
<input type="radio"/>	E. Smoking

Next question

Pregnant women are 3 times more likely to develop a Bell's palsy. Sarcoidosis may cause a facial nerve palsy but not Bell's palsy per se.

Bell's palsy

Bell's palsy may be defined as an acute, unilateral, idiopathic, facial nerve paralysis. The aetiology is unknown although the role of the herpes simplex virus has been investigated previously. The peak incidence is 20-40 years and the condition is more common in pregnant women.

Features

- lower motor neuron facial nerve palsy - forehead affected*
- patients may also notice post-auricular pain (may precede paralysis), altered taste, dry eyes, hyperacusis

Management

- in the past a variety of treatment options have been proposed including no treatment, prednisolone only and a combination of aciclovir and prednisolone
- following a National Institute for Health randomised controlled trial it is now recommended that prednisolone 1mg/kg for 10 days should be prescribed for patients within 72 hours of onset of Bell's palsy. Adding in aciclovir gives no additional benefit
- eye care is important - prescription of artificial tears and eye lubricants should be considered

Prognosis

- if untreated around 15% of patients have permanent moderate to severe weakness

*upper motor neuron lesion 'spares' upper face



Question 118 of 128

Next

You are assessing a 29-year-old woman who has been having worsening migraines for the past 6 months. These are typically preceded by aura. When taking the history, what is the longest duration of aura that is considered normal by NICE and British Association for the Study of Headache (BASH)?



A. 10 minutes

☐

B. 30 minutes

☒

C. 1 hour

☐

D. 2 hours

☐

E. 3 hours

Next question

Aura usually last between 5-60 minutes

Migraine: diagnostic criteria

The International Headache Society has produced the following diagnostic criteria for migraine without aura:

Point	Criteria
A	At least 5 attacks fulfilling criteria B-D
B	Headache attacks lasting 4-72 hours* (untreated or unsuccessfully treated)
C	Headache has at least two of the following characteristics: <ul style="list-style-type: none">1. unilateral location*2. pulsating quality (i.e., varying with the heartbeat)3. moderate or severe pain intensity4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D	During headache at least one of the following: <ul style="list-style-type: none">1. nausea and/or vomiting*2. photophobia and phonophobia
E	Not attributed to another disorder (history and examination do not suggest a secondary headache disorder or, if they do, it is ruled out by appropriate investigations or headache attacks do not occur for the first time in close

Point	Criteria
	temporal relation to the other disorder)

*In children, attacks may be shorter-lasting, headache is more commonly bilateral, and gastrointestinal disturbance is more prominent.

Migraine with aura (seen in around 25% of migraine patients) tends to be easier to diagnose with a typical aura being progressive in nature and may occur hours prior to the headache. Typical aura include a transient hemianopic disturbance or a spreading scintillating scotoma ('jagged crescent'). Sensory symptoms may also occur

If we compare these guidelines to the **NICE criteria** the following points are noted:

- NICE suggests migraines may be unilateral or bilateral
- NICE also give more detail about typical auras:

Auras may occur with or without headache and:

- are fully reversible
- develop over at least 5 minutes
- last 5-60 minutes

The following aura symptoms are atypical and may prompt further investigation/referral;

- motor weakness
- double vision
- visual symptoms affecting only one eye
- poor balance
- decreased level of consciousness.



Question 119 of 128

Next

You review a 65-year-old man in surgery who is currently taking antipsychotic medication for schizophrenia. His carers have noticed that his movements have been very slow over the past few weeks. Which one of the following would suggest a diagnosis of Parkinson's disease rather than drug-induced parkinsonism?

✓	<input checked="" type="radio"/>	A. Rigidity
✗	<input type="radio"/>	B. Masked face
	<input type="radio"/>	C. Bilateral symptoms
	<input type="radio"/>	D. Flexed posture
	<input type="radio"/>	E. Restlessness of arms and legs

[Next question](#)

Rigidity and rest tremor are uncommon in drug-induced parkinsonism. Masked face and flexed posture can be seen in both conditions. Bilateral symptoms are more common in drug-induced parkinsonism. Restlessness of arms and legs (akathisia) is a common side-effect of antipsychotics.

Parkinson's disease: features

Parkinson's disease is a progressive neurodegenerative condition caused by degeneration of dopaminergic neurons in the substantia nigra.. This results in a classic triad of features: bradykinesia, tremor and rigidity. The symptoms of Parkinson's disease are characteristically asymmetrical.

Epidemiology

- around twice as common in men
- mean age of diagnosis is 65 years

Bradykinesia

- poverty of movement also seen, sometimes referred to as hypokinesia
- short, shuffling steps with reduced arm swinging
- difficulty in initiating movement

Tremor

- most marked at rest, 3-5 Hz
- worse when stressed or tired
- typically 'pill-rolling', i.e. in the thumb and index finger

Rigidity

- lead pipe
- cogwheel: due to superimposed tremor

Other characteristic features

- mask-like facies
- flexed posture
- micrographia
- drooling of saliva
- psychiatric features: depression is the most common feature (affects about 40%); dementia, psychosis and sleep disturbances may also occur
- impaired olfaction
- REM sleep behaviour disorder

Drug-induced parkinsonism has slightly different features to Parkinson's disease:

- motor symptoms are generally rapid onset and bilateral
- rigidity and rest tremor are uncommon

0 / 3 **Question 120-122 of 128**

Next

Theme: Parkinson's disease: management

- | | |
|-----------|--------------|
| A. | Levodopa |
| B. | Amantadine |
| C. | Entacapone |
| D. | Procyclidine |
| E. | Ropinirole |
| F. | Cabergoline |

For each one of the following select the most appropriate answer from the options listed above:

120. Useful for managing tremor in drug-induced parkinsonism

 You answered Levodopa

The correct answer is Procyclidine

121. Has been associated with pulmonary fibrosis

 You answered Amantadine

The correct answer is Cabergoline

122. Often has a reduced effectiveness with time

 You answered Ropinirole

The correct answer is Levodopa

[Next question](#)

Parkinson's disease: management

Currently accepted practice in the management of patients with Parkinson's disease (PD) is to delay treatment until the onset of disabling symptoms and then to introduce a dopamine receptor agonist. If the patient is elderly, levodopa is sometimes used as an initial treatment.

Dopamine receptor agonists

- e.g. Bromocriptine, ropinirole, cabergoline, apomorphine
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide*) have been associated with pulmonary, retroperitoneal and cardiac fibrosis. The Committee on Safety of Medicines advice that an echocardiogram, ESR, creatinine and chest x-ray should be obtained prior to treatment and patients should be closely monitored
- patients should be warned about the potential for dopamine receptor agonists to cause impulse control disorders and excessive daytime somnolence

- more likely than levodopa to cause hallucinations in older patients. Nasal congestion and postural hypotension are also seen in some patients

Levodopa

- usually combined with a decarboxylase inhibitor (e.g. carbidopa or benserazide) to prevent peripheral metabolism of levodopa to dopamine
- reduced effectiveness with time (usually by 2 years)
- unwanted effects: dyskinesia (involuntary writhing movements), 'on-off' effect, dry mouth, anorexia, palpitations, postural hypotension, psychosis, drowsiness
- no use in neuroleptic induced parkinsonism

MAO-B (Monoamine Oxidase-B) inhibitors

- e.g. Selegiline
- inhibits the breakdown of dopamine secreted by the dopaminergic neurons

Amantadine

- mechanism is not fully understood, probably increases dopamine release and inhibits its uptake at dopaminergic synapses
- side-effects include ataxia, slurred speech, confusion, dizziness and livedo reticularis

COMT (Catechol-O-Methyl Transferase) inhibitors

- e.g. Entacapone, tolcapone
- COMT is an enzyme involved in the breakdown of dopamine, and hence may be used as an adjunct to levodopa therapy
- used in conjunction with levodopa in patients with established PD

Antimuscarinics

- block cholinergic receptors
- now used more to treat drug-induced parkinsonism rather than idiopathic Parkinson's disease
- help tremor and rigidity
- e.g. procyclidine, benztropine, trihexyphenidyl (benzhexol)

*pergolide was withdrawn from the US market in March 2007 due to concern regarding increased incidence of valvular dysfunction



Question 123 of 128

Next

A 23-year-old man with a history of migraine presents for review. His headaches are now occurring about once a week. He describes unilateral, throbbing headaches that may last over 24 hours. Neurological examination is unremarkable. Other than a history of asthma he is fit and well. What is the most suitable therapy to reduce the frequency of migraine attacks?



- | | |
|----------------------------------|------------------|
| <input type="radio"/> | A. Propranolol |
| <input type="radio"/> | B. Zolmitriptan |
| <input checked="" type="radio"/> | C. Topiramate |
| <input type="radio"/> | D. Amitriptyline |
| <input type="radio"/> | E. Pizotifen |

Next question

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Pizotifen is used less commonly nowadays due to side-effects such as weight gain. Propranolol should be avoided in asthmatics.

The October 2009 AKT feedback report highlighted the pharmacological management of headache as an area causing difficulty for candidates.

Migraine: management

It should be noted that as a general rule 5-HT receptor agonists are used in the acute treatment of

migraine whilst 5-HT receptor antagonists are used in prophylaxis. NICE produced guidelines in 2012 on the management of headache, including migraines.

Acute treatment

- first-line: offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol
- for young people aged 12-17 years consider a nasal triptan in preference to an oral triptan
- if the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide* or prochlorperazine and consider adding a non-oral NSAID or triptan

Prophylaxis

- prophylaxis should be given if patients are experiencing 2 or more attacks per month. Modern treatment is effective in about 60% of patients.
- NICE advise either topiramate or propranolol 'according to the person's preference, comorbidities and risk of adverse events'. Propranolol should be used in preference to topiramate in women of child bearing age as it may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
- if these measures fail NICE recommend 'a course of up to 10 sessions of acupuncture over 5-8 weeks' or gabapentin
- NICE recommend: 'Advise people with migraine that riboflavin (400 mg once a day) may be effective in reducing migraine frequency and intensity for some people'
- for women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- pizotifen is no longer recommend. Adverse effects such as weight gain & drowsiness are common

*caution should be exercised with young patients as acute dystonic reactions may develop



Question 124 of 128

Next

A 55-year-old man is diagnosed with motor neuron disease. Which one of the following drugs has been shown to confer a survival benefit?

	<input type="radio"/>	A. Rituximab
	<input checked="" type="radio"/>	B. Riluzole
	<input type="radio"/>	C. Interferon-beta
	<input type="radio"/>	D. Cyclophosphamide
	<input type="radio"/>	E. Interferon-alpha

[Next question](#)

Motor neuron disease: management

Motor neuron disease is a neurological condition of unknown cause which can present with both upper and lower motor neuron signs. It rarely presents before 40 years and various patterns of disease are recognised including amyotrophic lateral sclerosis, progressive muscular atrophy and bulbar palsy

Riluzole

- prevents stimulation of glutamate receptors
- used mainly in amyotrophic lateral sclerosis
- prolongs life by about 3 months

Respiratory care

- non-invasive ventilation (usually BIPAP) is used at night
- studies have shown a survival benefit of around 7 months

Prognosis

- poor: 50% of patients die within 3 years



A 54-year-old man presents with a persistent tremor. On examination there is 6-8 Hz tremor of the arms which is worse when his arms are outstretched. His father suffered from a similar complaint. What is the most suitable first-line treatment?



<input type="radio"/>	A. Amitriptyline
<input checked="" type="radio"/>	B. Propranolol
<input type="radio"/>	C. D-penicillamine
<input type="radio"/>	D. Levodopa
<input type="radio"/>	E. Diazepam

[Next question](#)

Essential tremor is an AD condition that is made worse when arms are outstretched, made better by alcohol and propranolol

This patient has a typical history of essential tremor. Propranolol is generally considered the first-line treatment

Essential tremor

Essential tremor (previously called benign essential tremor) is an autosomal dominant condition which usually affects both upper limbs

Features

- postural tremor: worse if arms outstretched
- improved by alcohol and rest
- most common cause of titubation (head tremor)

Management

- propranolol is first-line
- primidone is sometimes used



Question 126 of 128

Next

Antiepileptic medication is known to increase the risk of congenital defects. Which one of the following medications is thought to be associated with the lowest risk?

- | | |
|----------------------------------|---------------------|
| <input type="radio"/> | A. Levetiracetam |
| <input type="radio"/> | B. Sodium valproate |
| <input checked="" type="radio"/> | C. Phenytoin |
| <input checked="" type="radio"/> | D. Carbamazepine |
| <input type="radio"/> | E. Gabapentin |

Next question

Epilepsy: pregnancy and breast feeding

The risks of uncontrolled epilepsy during pregnancy generally outweigh the risks of medication to the fetus. All women thinking about becoming pregnant should be advised to take folic acid 5mg per day well before pregnancy to minimise the risk of neural tube defects. Around 1-2% of newborns born to non-epileptic mothers have congenital defects. This rises to 3-4% if the mother takes antiepileptic medication.

Other points

- aim for monotherapy
- there is no indication to monitor antiepileptic drug levels
- sodium valproate: associated with neural tube defects
- carbamazepine: often considered the least teratogenic of the older antiepileptics
- phenytoin: associated with cleft palate
- lamotrigine: studies to date suggest the rate of congenital malformations may be low. The dose of lamotrigine may need to be increased in pregnancy

Breast feeding is generally considered safe for mothers taking antiepileptics with the possible

exception of the barbiturates

It is advised that pregnant women taking phenytoin are given vitamin K in the last month of pregnancy to prevent clotting disorders in the newborn

Sodium valproate

The November 2013 issue of the Drug Safety Update also carried a warning about new evidence showing a significant risk of neurodevelopmental delay in children following maternal use of sodium valproate.

The update concludes that sodium valproate should not be used during pregnancy and in women of childbearing age unless clearly necessary. Women of childbearing age should not start treatment without specialist neurological or psychiatric advice.



Question 127 of 128

Next

A 76-year-old man is reviewed in the Elderly Medicine clinic. He is concerned about his increasing forgetfulness over the past six months. His daughter notes he has generally 'slowed down' and struggles to follow conversations. Over the past month he has noted increasingly frequent episodes of urinary incontinence. He has also had one episode of faecal incontinence in the past week. On examination he is noted to have brisk reflexes and a short, shuffling gait. No cerebellar signs are noted. What is the most likely diagnosis?

- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Multiple system atrophy |
| <input checked="" type="radio"/> | B. Parkinson's disease |
| <input checked="" type="radio"/> | C. Normal pressure hydrocephalus |
| <input type="radio"/> | D. Urinary tract infection |
| <input type="radio"/> | E. Pick's disease |

Next question

Urinary incontinence + gait abnormality + dementia = normal pressure hydrocephalus

The presence of dementia and absence of cerebellar signs point away from a diagnosis of multiple system atrophy

Normal pressure hydrocephalus

Normal pressure hydrocephalus is a reversible cause of dementia seen in elderly patients. It is thought to be secondary to reduced CSF absorption at the arachnoid villi. These changes may be secondary to head injury, subarachnoid haemorrhage or meningitis

A classical triad of features is seen

- urinary incontinence
- dementia and bradyphrenia
- gait abnormality (may be similar to Parkinson's disease)

Imaging

- hydrocephalus with an enlarged fourth ventricle

Management

- ventriculoperitoneal shunting



Question 128 of 128

Which one of the following infections is most strongly associated with the development of Guillain-Barre syndrome

<input type="radio"/>	A. <i>Shigella</i>
<input type="radio"/>	B. <i>Salmonella</i>
<input type="radio"/>	C. <i>E. coli</i> H7:0157
<input type="radio"/>	D. Herpes simplex



E. *Campylobacter jejuni*

Campylobacter jejuni is strongly associated with the development of Guillain-Barre syndrome.

Guillain-Barre syndrome

Guillain-Barre syndrome describes an immune mediated demyelination of the peripheral nervous system often triggered by an infection (classically *Campylobacter jejuni*)

Pathogenesis

- cross reaction of antibodies with gangliosides in the peripheral nervous system
- correlation between anti-ganglioside antibody (e.g. anti-GM1) and clinical features has been demonstrated
- anti-GM1 antibodies in 25% of patients

Miller Fisher syndrome

- variant of Guillain-Barre syndrome
- associated with ophthalmoplegia, areflexia and ataxia. The eye muscles are typically affected first
- usually presents as a descending paralysis rather than ascending as seen in other forms of Guillain-Barre syndrome
- anti-GQ1b antibodies are present in 90% of cases

Question 1-3 of 62

Theme: Lower back pain

- | | |
|-----------|-----------------------------------|
| A. | Peripheral arterial disease |
| B. | Prolapsed disc |
| C. | Facet joint pain |
| D. | Perforated duodenal ulcer |
| E. | Leaking abdominal aortic aneurysm |
| F. | Pyelonephritis |
| G. | Ankylosing spondylitis |
| H. | Rheumatoid arthritis |
| I. | Crush fracture |
| J. | Spinal stenosis |

For each one of the following scenarios please select the most likely diagnosis:

1. A 34-year-old man reports the sudden onset of back pain after bending over to tie his shoe laces. There is tenderness over the lumbar spine on examination and leaning back worsens the pain. Neurological examination and straight leg raising is normal

✓ Facet joint pain

Although patients often give a history of bending prior to disc prolapse the normal straight leg raising makes this diagnosis less likely.

2. A 76-year-old man reports pain in his buttocks when he walks the dog. The pain comes on after around 500 yards and resolves when he stops. He has a past history of chronic obstructive pulmonary disease and ischaemic heart disease. Neurological examination is normal and the foot pulses are difficult to feel in both feet

✓ Peripheral arterial disease

3. A 68-year-old obese man presents with a one day history progressively severe lower back pain. There was no obvious trigger. Abdominal examination is unremarkable. Blood pressure is 90/60 mmHg and his pulse is 120 bpm

✓ Leaking abdominal aortic aneurysm

Whilst patients often suffer an acute haemodynamic collapse a number of patients will have more sub-acute symptoms if the aneurysm is leaking prior to rupture.

[Next question](#)

Lower back pain

Lower back pain (LBP) is one of the most common presentations seen in practice. Whilst the majority of presentations will be of a non-specific muscular nature it is worth keeping in mind possible causes which may need specific treatment.

Red flags for lower back pain

- age < 20 years or > 50 years
- history of previous malignancy
- night pain
- history of trauma
- systemically unwell e.g. weight loss, fever

The table below indicates some specific causes of LBP:


Facet joint	May be acute or chronic Pain worse in the morning and on standing On examination there may be pain over the facets. The pain is typically worse on extension of the back
Spinal stenosis	Usually gradual onset Unilateral or bilateral leg pain (with or without back pain), numbness, and weakness which is worse on walking. Resolves when sits down. Pain may be described as 'aching', 'crawling'. Relieved by sitting down, leaning forwards and crouching down Clinical examination is often normal Requires MRI to confirm diagnosis
Ankylosing spondylitis	Typically a young man who presents with lower back pain and stiffness Stiffness is usually worse in morning and improves with activity Peripheral arthritis (25%, more common if female)

Facet joint	<p>May be acute or chronic</p> <p>Pain worse in the morning and on standing</p> <p>On examination there may be pain over the facets. The pain is typically worse on extension of the back</p>
Peripheral arterial disease	<p>Pain on walking, relieved by rest</p> <p>Absent or weak foot pulses and other signs of limb ischaemia</p> <p>Past history may include smoking and other vascular diseases</p>

Next

Question 4 of 62

A 38-year-old woman develops lower back pain radiating down her right leg whilst performing DIY. She describes a severe, sharp, stabbing pain which is worse on movement. Clinical examination reveals a positive straight leg raise test on the right-hand side. Appropriate analgesia is prescribed. Of the following, what is the most suitable next-step in management?

- ☐ A. Check ESR
-  ☒ B. Arrange physiotherapy
- ☐ C. Refer for MRI
- ☐ D. Perform a vaginal examination
- ☐ E. Lumbar spine x-ray

Next question

This patient has symptoms consistent with a prolapsed disc. Even if this is proven by a MRI scan it would not change the initial management as the vast majority of patients improve with conservative treatment such as physiotherapy.

Lower back pain: prolapsed disc

A prolapsed lumbar disc usually produces clear dermatomal leg pain associated with neurological deficits.

Features

- leg pain usually worse than back
- pain often worse when sitting

The table below demonstrates the expected features according to the level of compression:

Site of compression	Features
L3 nerve root compression	Sensory loss over anterior thigh Weak quadriceps Reduced knee reflex Positive femoral stretch test
L4 nerve root compression	Sensory loss anterior aspect of knee Weak quadriceps Reduced knee reflex Positive femoral stretch test
L5 nerve root compression	Sensory loss dorsum of foot Weakness in foot and big toe dorsiflexion Reflexes intact Positive sciatic nerve stretch test
S1 nerve root compression	Sensory loss posterolateral aspect of leg and lateral aspect of foot Weakness in plantar flexion of foot Reduced ankle reflex Positive sciatic nerve stretch test

Management

- similar to that of other musculoskeletal lower back pain: analgesia, physiotherapy, exercises
- if symptoms persist then referral for consideration of MRI is appropriate

Question 5 of 62

Next

A patient is noted to have an absent ankle reflex. Which nerve root does this correspond to?

☐

A. L2-L3

- ☐ B. L3-L4
- ☐ C. S3-S4
-  ☒ D. S1-S2
- ☐ E. L1-L2

Next question

Reflexes

The common reflexes are listed below:

Reflex	Root
Ankle	S1-S2
Knee	L3-L4
Biceps	C5-C6
Triceps	C7-C8

Question 6 of 62

Next

A 65-year-old man presents with bilateral leg pain that is brought on by walking. His past medical history includes peptic ulcer disease and osteoarthritis. He can typically walk for around 5 minutes before it develops. The pain subsides when he sits down. He has also noticed that leaning forwards or crouching improves the pain. Musculoskeletal and vascular examination of his lower limbs is unremarkable. What is the most likely diagnosis?

- ☐ A. Inflammatory arachnoiditis

- ☐ B. Peripheral arterial disease
- ☐ C. Raised intracranial pressure
- ✓ ☒ D. Spinal stenosis
- ☐ E. Lumbar vertebral crush fracture

Next question

This is a classic presentation of spinal stenosis. Whilst peripheral arterial disease is an obvious differential the characteristic relieving factors of the pain and normal vascular examination point away from this diagnosis.

Lower back pain

Lower back pain (LBP) is one of the most common presentations seen in practice. Whilst the majority of presentations will be of a non-specific muscular nature it is worth keeping in mind possible causes which may need specific treatment.

Red flags for lower back pain

- age < 20 years or > 50 years
- history of previous malignancy
- night pain
- history of trauma
- systemically unwell e.g. weight loss, fever

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Ankylosing spondylitis	<p>Typically a young man who presents with lower back pain and stiffness</p> <p>Stiffness is usually worse in morning and improves with activity</p> <p>Peripheral arthritis (25%, more common if female)</p>
Peripheral arterial disease	<p>Pain on walking, relieved by rest</p> <p>Absent or weak foot pulses and other signs of limb ischaemia</p> <p>Past history may include smoking and other vascular diseases</p>

Next

Question 7 of 62

A 14-year-old presents with left knee pain for the past 4 weeks. There is no history of trauma. The pain is felt in the anterior aspect of the joint and is worse when walking up and down stairs. Examination is unremarkable. What is the most likely diagnosis?

- ✓ ☒ A. Chondromalacia patellae
- ☐ B. Osteoarthritis
- ✗ ☐ C. Osgood-Schlatter disease
- ☐ D. Osteogenesis imperfecta
- ☐ E. Osteochondritis dissecans

Next question

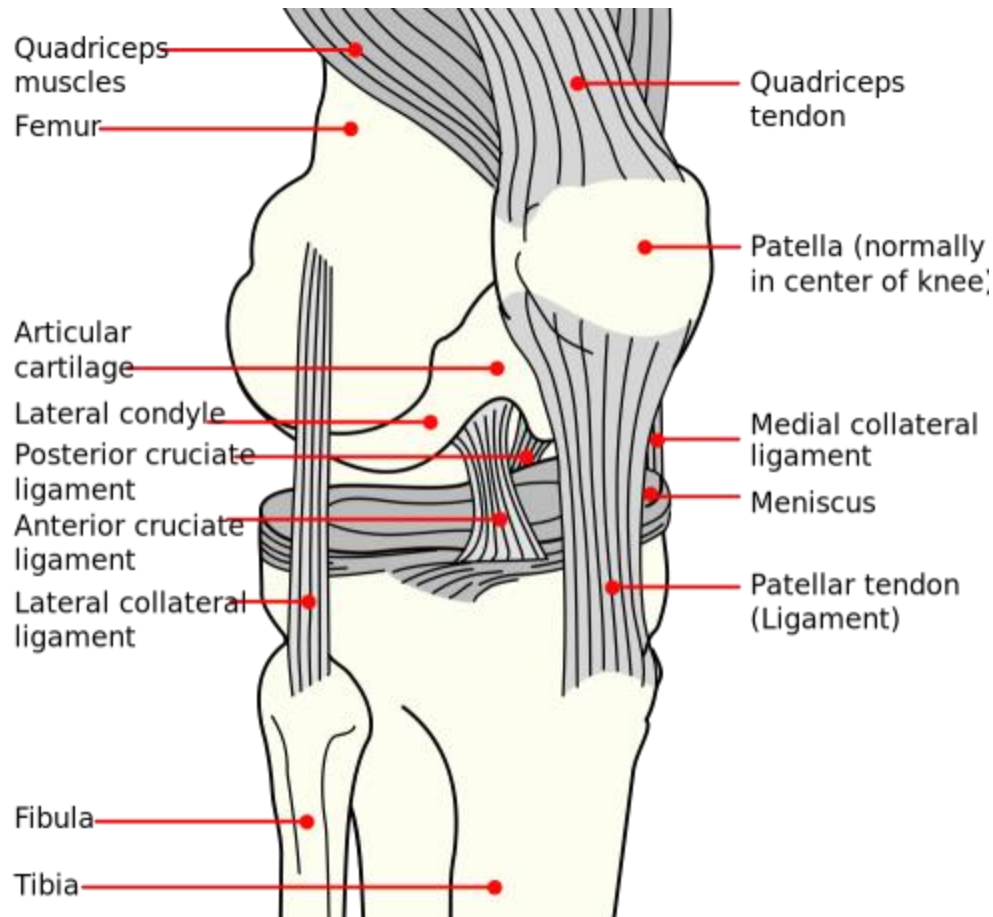
Knee problems: children and young adults

The table below summarises the key features of common knee problems:

Condition	Key features
-----------	--------------

Condition	Key features
Chondromalacia patellae	Softening of the cartilage of the patella Common in teenage girls Characteristically anterior knee pain on walking up and down stairs and rising from prolonged sitting Usually responds to physiotherapy
Osgood-Schlatter disease (tibial apophysitis)	Seen in sporty teenagers Pain, tenderness and swelling over the tibial tubercle
Osteochondritis dissecans	Pain after exercise Intermittent swelling and locking
Patellar subluxation	Medial knee pain due to lateral subluxation of the patella Knee may give way
Patellar tendonitis	More common in athletic teenage boys Chronic anterior knee pain that worsens after running Tender below the patella on examination

Referred pain may come from hip problems such as slipped upper femoral epiphysis



Question 8 of 62

Next

A 13-year-old girl presents to clinic with right knee pain. She is a keen hockey player but has had no recent injuries. On examination there is a painful swelling over the tibial tubercle. What is the most likely diagnosis?



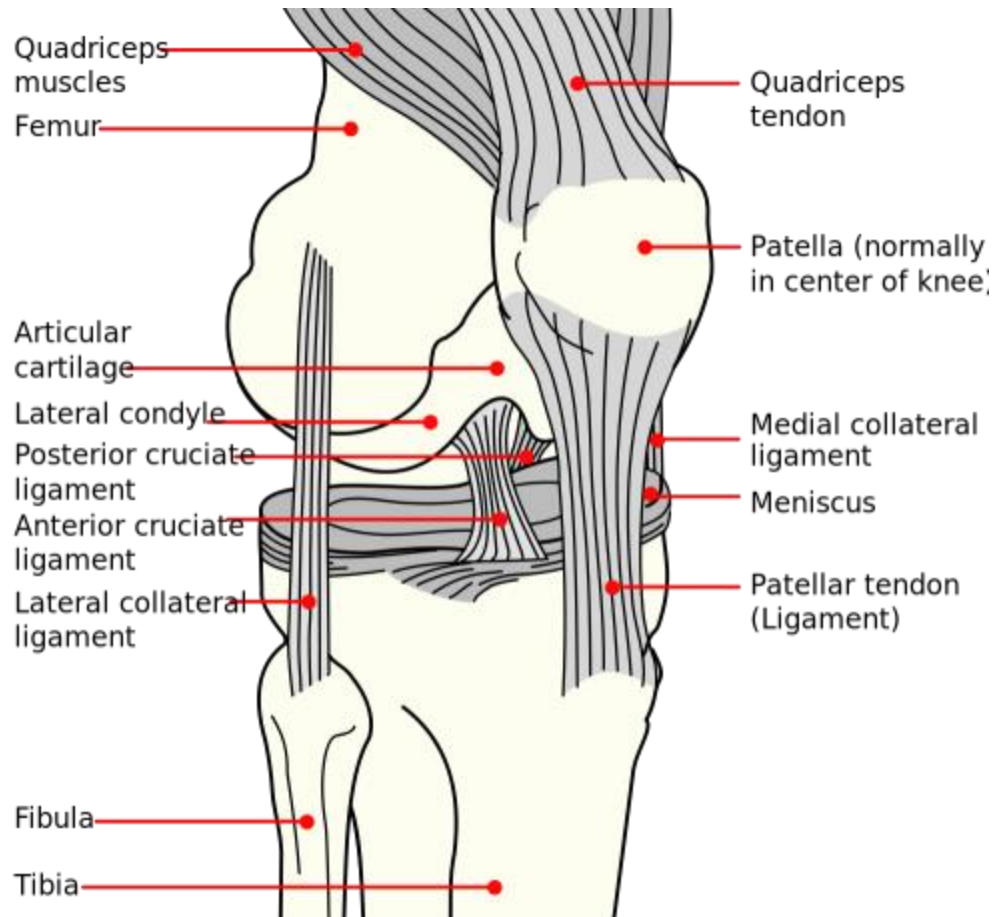
- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Chondromalacia patellae |
| <input type="radio"/> | B. Osteosarcoma |
| <input checked="" type="radio"/> | C. Osgood-Schlatter disease |
| <input type="radio"/> | D. Osteochondritis dissecans |
| <input type="radio"/> | E. Juvenile idiopathic arthritis |

Knee problems: children and young adults

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Referred pain may come from hip problems such as slipped upper femoral epiphysis



Question 9 of 62

Next

A 75-year-old female presents with sensory loss to the little finger and wasting of the hypothenar eminence. Where is the likely lesion?

- | | |
|----------------------------------|--------------------------------|
| <input type="radio"/> | A. Common peroneal nerve |
| <input type="radio"/> | B. Median nerve |
| <input type="radio"/> | C. Radial nerve |
| <input type="radio"/> | D. Anterior interosseous nerve |
| <input checked="" type="radio"/> | E. Ulnar nerve |



Ulnar nerve

Overview

- arises from medial cord of brachial plexus (C8, T1)

Motor to

- medial two lumbricals
- adductor pollicis
- interossei
- hypothenar muscles: abductor digiti minimi, flexor digiti minimi
- flexor carpi ulnaris

Sensory to

- medial 1 1/2 fingers (palmar and dorsal aspects)

Patterns of damage

Damage at wrist

- 'claw hand' - hyperextension of the metacarpophalangeal joints and flexion at the distal and proximal interphalangeal joints of the 4th and 5th digits
- wasting and paralysis of intrinsic hand muscles (except lateral two lumbricals)
- wasting and paralysis of hypothenar muscles
- sensory loss to the medial 1 1/2 fingers (palmar and dorsal aspects)

Damage at elbow

- as above (however, ulnar paradox - clawing is more severe in distal lesions)
- radial deviation of wrist



Question 10 of 62

Next

A 64-year-old woman who is known to have rheumatoid arthritis presents with pain in her right ring finger when she flexes it. On one occasion she reports it became 'stuck'. Clinical examination is unremarkable other than a palpable nodule at the base of the finger. What is the most likely diagnosis?

- | | |
|----------------------------------|----------------------------|
| <input type="radio"/> | A. Swan-neck deformity |
| <input type="radio"/> | B. Dupuytren's contracture |
| <input checked="" type="radio"/> | C. Trigger finger |
| <input type="radio"/> | D. Mallet finger |
| <input type="radio"/> | E. Boutonniere deformity |

Next question

Trigger finger

Trigger finger is a common condition associated with abnormal flexion of the digits. It is thought to be caused by a disparity between the size of the tendon and pulleys through which they pass. In simple terms the tendon becomes 'stuck' and cannot pass smoothly through the pulley.

Associations* (idiopathic in the majority)

- more common in women than men
- rheumatoid arthritis
- diabetes mellitus

Features

- more common in the thumb, middle, or ring finger
- initially stiffness and snapping ('trigger') when extending a flexed digit
- a nodule may be felt at the base of the affected finger

Management

- steroid injection is successful in the majority of patients. A finger splint may be applied afterwards
- surgery should be reserved for patients who have not responded to steroid injections

*there is scanty evidence to support a link with repetitive use



Question 11 of 62

Next

A 43-year-old woman presents with pain in the right elbow. This has been present for the past month and she reports no obvious trigger. On examination she reports pain on wrist extension against resistance whilst the elbow is extended. What is the most likely diagnosis?

- | | |
|----------------------------------|----------------------------|
| <input type="radio"/> | A. Cubital tunnel syndrome |
| <input checked="" type="radio"/> | B. Lateral epicondylitis |
| <input type="radio"/> | C. Carpal tunnel syndrome |
| <input checked="" type="radio"/> | D. Medial epicondylitis |
| <input type="radio"/> | E. Pronator syndrome |

Next question

Lateral epicondylitis

Lateral epicondylitis typically follows unaccustomed activity such as house painting or playing tennis ('tennis elbow'). It is most common in people aged 45-55 years and typically affects the dominant arm.

Features

- pain and tenderness localised to the lateral epicondyle
- pain worse on wrist extension against resistance with the elbow extended or supination of the forearm with the elbow extended
- episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks

Management options

- advice on avoiding muscle overload
- simple analgesia
- steroid injection
- physiotherapy



Question 12 of 62

Next

A 23-year-old man wakes up on a Sunday morning unable to extend his wrist . He had been drinking heavily the previous night. What is the likely cause of his weakness?



<input type="radio"/>	A. Wernicke's encephalopathy
<input checked="" type="radio"/>	B. Radial nerve palsy
<input type="radio"/>	C. Subacute combined degeneration of the cord
<input type="radio"/>	D. Acute B12 deficiency
<input type="radio"/>	E. Ulnar nerve palsy

Next question

This man has 'Saturday night palsy' caused by compression of the radial nerve against the humeral shaft, possibly due to sleeping on a hard chair with his arm draped over the back

Radial nerve

Overview

- arises from the posterior cord of the brachial plexus (C5-8)

Motor to

- extensor muscles (forearm, wrist, fingers, thumb)

Sensory to

- dorsal aspect of lateral 3 1/2 fingers
- however, only small area between the dorsal aspect of the 1st and 2nd metacarpals is unique to the radial nerve

Patterns of damage

- wrist drop
- sensory loss to small area between the dorsal aspect of the 1st and 2nd metacarpals

Axillary damage

- as above
- paralysis of triceps



Question 13 of 62

Next

A 45-year-old man presents with a painful swelling on the posterior aspect of his elbow. There is no history of trauma. On examination an erythematous tender swelling is noted. What is the most likely diagnosis?

<input type="radio"/>	A. Synovial cyst
<input type="radio"/>	B. Haemarthrosis
<input type="radio"/>	C. Septic arthritis

- ☐ D. Gout
- ✓ ☒ E. Olecranon bursitis

[Next question](#)

Elbow pain

The table below details some of the characteristic features of conditions causing elbow pain:

	Features
Lateral epicondylitis (tennis elbow)	<ul style="list-style-type: none"> • pain and tenderness localised to the lateral epicondyle • pain worse on resisted wrist extension with the elbow extended or supination of the forearm with the elbow extended • episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks
Medial epicondylitis (golfer's elbow)	<p>Features</p> <ul style="list-style-type: none"> • pain and tenderness localised to the medial epicondyle • pain is aggravated by wrist flexion and pronation • symptoms may be accompanied by numbness / tingling in the 4th and 5th finger due to ulnar nerve involvement
Radial tunnel syndrome	<p>Most commonly due to compression of the posterior interosseous branch of the radial nerve. It is thought to be a result of overuse.</p> <p>Features</p> <ul style="list-style-type: none"> • symptoms are similar to lateral epicondylitis making it difficult to diagnose • however, the pain tends to be around 4-5 cm distal to the lateral epicondyle • symptoms may be worsened by extending the elbow and pronating the forearm
Cubital tunnel syndrome	<p>Due to the compression of the ulnar nerve.</p> <p>Features</p>

Lateral epicondylitis (tennis elbow)	<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • pain and tenderness localised to the lateral epicondyle • pain worse on resisted wrist extension with the elbow extended or supination of the forearm with the elbow extended • episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks
	<ul style="list-style-type: none"> • initially intermittent tingling in the 4th and 5th finger • may be worse when the elbow is resting on a firm surface or flexed for extended periods • later numbness in the 4th and 5th finger with associated weakness
Olecranon bursitis	Swelling over the posterior aspect of the elbow. There may be associated pain, warmth and erythema. It typically affects middle-aged male patients.



Question 14 of 62

Next

A 65-year-old woman phones for advice following a recent elective hip replacement. She has been told she needs to have 'blood-thinning' injections but is unsure how long these should continue. According to NICE guidelines how long should patients receive low-molecular weight heparin following an elective hip replacement?

- ☐ A. 7 days
- ☐ B. 14 days
- ☒ C. 4 weeks
- ☐ D. 2 months
- ☐ E. 3 months

Next question

Hip replacement: LMWH for 4 weeks

Osteoarthritis: joint replacement

Joint replacement (arthroplasty) remains the most effective treatment for osteoarthritis patients who experience significant pain.

Selection criteria

- around 25% of patients are now younger than 60-years-old
- whilst obesity is often thought to be a barrier to joint replacement there is only a slight increase in short-term complications. There is no difference in long-term joint replacement survival

Surgical techniques

- for hips the most common type of operation is a cemented hip replacement. A metal femoral component is cemented into the femoral shaft. This is accompanied by a cemented acetabular polyethylene cup
- uncemented hip replacements are becoming increasingly popular, particularly in younger more active patients. They are more expensive than conventional cemented hip replacements
- hip resurfacing is also sometimes used where a metal cap is attached over the femoral head. This is often used in younger patients and has the advantage that the femoral neck is preserved which may be useful if conventional arthroplasty is needed later in life

Post-operative recovery

- patients receive both physiotherapy and a course of home-exercises
- walking sticks or crutches are usually used for up to 6 weeks after hip or knee replacement surgery

Patients who have had a hip replacement operation should receive basic advice to minimise the risk of dislocation:

- avoiding flexing the hip > 90 degrees
- avoid low chairs
- do not cross your legs
- sleep on your back for the first 6 weeks

Complications

- wound and joint infection
- thromboembolism: NICE recommend patients receive low-molecular weight heparin for 4 weeks following a hip replacement
- dislocation



Question 15 of 62

Next

A 50-year-old woman presents with pain in the right forefoot for the past three months. The pain is described as a burning which is brought on by walking. There is no history of trauma and the patient does not do any regular exercise. Her alcohol intake is 28 units per week. On examination she complains of tenderness in the middle of the forefoot and her symptoms are recreated by squeezing the metatarsals together. What is the most likely diagnosis?

<input type="radio"/>	A. Metatarsal stress fracture
<input type="radio"/>	B. Gout
<input checked="" type="radio"/>	C. Alcohol-related peripheral neuropathy
<input type="radio"/>	D. Plantar fasciitis
<input checked="" type="radio"/>	E. Morton's neuroma

Next question

The examination findings would not support a diagnosis of alcohol-related peripheral neuropathy.

Morton's neuroma

Morton's neuroma is a benign neuroma affecting the intermetatarsal plantar nerve, most commonly in the third inter-metatarsophalangeal space. The female to male ratio is around 4:1.

Features

- forefoot pain, most commonly in the third inter-metatarsophalangeal space
- worse on walking. May be described as a shooting or burning pain. Patients may feel they have a pebble in their shoe
- Mulder's click: one hand tries to hold the neuroma between the finger and thumb. The other hand squeezes the metatarsals together. A click may be heard as the neuroma moves between the metatarsal heads
- there may be loss of sensation distally in the toes

Diagnosis is usually clinical although ultrasound may be helpful in confirming the diagnosis

Management

- avoid high-heels
- metatarsal pad
- CKS recommends referral if symptoms persist for > 3 months despite footwear modifications and the use of metatarsal pads
- orthotists may give the patient a metatarsal dome orthotic
- other secondary care options include corticosteroid injection and neurectomy of the involved interdigital nerve and neuroma



Question 16 of 62

Next

A 14-year-old boy is brought to surgery by his mother. For the past two weeks he has been complaining of pain in his distal right thigh, which is made worse when he runs. On examination he is noted to be obese and have a full range of movement in the right knee. He is able to flex his right hip fully but internal rotation is painful. What is the most likely diagnosis?



A. Transient synovitis

- ☐ B. Perthes disease
- ☐ C. Trochanteric bursitis
- ☐ D. Medial collateral ligament strain
- ✓ ☒ E. Slipped upper femoral epiphysis

Next question

Slipped upper femoral epiphysis - typically an overweight adolescent boy with knee / hip problems

This is a classic presentation of slipped upper femoral epiphysis. The child's obesity is a strong clue.

Hip problems in children

The table below provides a brief summary of the potential causes of hip problems in children

Condition	Notes
Development dysplasia of the hip	Often picked up on newborn examination Barlow's test, Ortolani's test are positive Unequal skin folds/leg length
Transient synovitis (irritable hip)	Typical age group = 2-10 years Acute hip pain associated with viral infection Commonest cause of hip pain in children
Perthes disease	Perthes disease is a degenerative condition affecting the hip joints of children, typically between the ages of 4-8 years. It is due to avascular necrosis of the femoral head Perthes disease is 5 times more common in boys. Around 10% of cases are bilateral Features <ul style="list-style-type: none"> hip pain: develops progressively over a few weeks limp stiffness and reduced range of hip movement x-ray: early changes include widening of joint space, later changes include decreased femoral head size/flattening

Condition	Notes
Slipped upper femoral epiphysis	<p>Typical age group = 10-15 years</p> <p>More common in obese children and boys</p> <p>Displacement of the femoral head epiphysis postero-inferiorly</p> <p>Bilateral slip in 20% of cases</p> <p>May present acutely following trauma or more commonly with chronic, persistent symptoms</p> <p>Features</p> <ul style="list-style-type: none"> • knee or distal thigh pain is common • loss of internal rotation of the leg in flexion
Juvenile idiopathic arthritis (JIA)	<p>Preferred to the older term juvenile chronic arthritis, describes arthritis occurring in someone who is less than 16 years old that lasts for more than three months. Pauciarticular JIA refers to cases where 4 or less joints are affected. It accounts for around 60% of cases of JIA</p> <p>Features of pauciarticular JIA</p> <ul style="list-style-type: none"> • joint pain and swelling: usually medium sized joints e.g. knees, ankles, elbows • limp • ANA may be positive in JIA - associated with anterior uveitis
Septic arthritis	<p>Acute hip pain associated with systemic upset e.g. pyrexia. Inability/severe limitation of affected joint</p>

Image gallery



© Image used on license from [Radiopaedia](#)



Perthes disease - both femoral epiphyses show extensive destruction, the acetabula are deformed



© Image used on license from [Radiopaedia](#)



Perthes disease - bilateral disease



© Image used on license from [Radiopaedia](#)



Slipped upper femoral epiphysis - left side





Slipped upper femoral epiphysis - left side



Question 17 of 62

Next

A 45-year-old man is reviewed in surgery. He has a three month history of lower back pain which has not been helped by physiotherapy. Which one of the following should be considered as a possible treatment?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Lumbar support |
| <input type="radio"/> | B. Radiofrequency facet joint denervation |
| <input type="radio"/> | C. TENS |
| <input checked="" type="radio"/> | D. Acupuncture |
| <input type="radio"/> | E. Starting an SSRI |

Next question

Acupuncture is the only one of the above which is recommended by NICE.

Lower back pain: investigation and management

Much of the following is based on the 2009 NICE low back pain guidelines. They apply to patients with non-specific lower back pain (i.e. not due to malignancy, infection, trauma etc) that has lasted for more than 6 weeks and less than 12 months.

Investigation

- lumbar spine x-ray should not be offered
- MRI should only be offered to patients with non-specific back pain where spinal fusion is being considered and to patients where malignancy, infection, fracture, cauda equina or ankylosing spondylitis is suspected

Advice to people with low back pain

- try to encourage self-management
- stay physically active and exercise

Analgesia

- paracetamol is first-line
- proton pump inhibitors should be co-prescribed for patients over the age of 45 years who are given NSAIDs
- tricyclic antidepressants should be considered if other medications are insufficient
- strong opioids should be considered for short-term use

NICE suggest that one of the following three treatments should be offered:

- exercise programme
- manual therapy
- acupuncture

Patients who have received at least one of the above treatments and who have high disability and/or psychological distress should be considered for a combined physical and psychological treatment programme, comprising around 100 hours over a maximum of 8 weeks.

Exercise programme

- up to 8 sessions over up to 12 weeks
- supervised group exercise

Manual therapy

- up to 9 sessions over up to 12 weeks
- includes spinal manipulation, spinal mobilisation and massage
- spinal manipulation can be performed by chiropractors and osteopaths, and doctors/physiotherapists who have undergone specialist training

Acupuncture

- up to 10 sessions over up to 12 weeks



Question 18 of 62

Next

You are performing a newborn examination. Which one of the following best describes the clinical findings of a clubfoot?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. Inverted + plantar flexed foot which is not passively correctable |
| <input type="radio"/> | B. Inverted + dorsiflexed foot + pes planus which is not passively correctable |
| <input type="radio"/> | C. Inverted + plantar flexed foot + pes planus which is passively correctable |
| <input type="radio"/> | D. Everted + dorsiflexed foot which is not passively correctable |
| <input type="radio"/> | E. Inverted + plantar flexed foot which is passively correctable |

Next question

Talipes equinovarus

Talipes equinovarus, or club foot, describes an inverted (inward turning) and plantar flexed foot. It is usually diagnosed on the newborn exam.

Talipes equinovarus is twice as common in males than females and has an incidence of 1 per 1,000 births. Around 50% of cases are bilateral.

Most commonly idiopathic. Associations include:

- spina bifida
- cerebral palsy
- Edward's syndrome (trisomy 18)
- oligohydramnios
- arthrogryposis

The diagnosis is clinical (the deformity is not passively correctable) and imaging is not normally needed.

Management*

- in recent years there has been a move away from surgical intervention to more conservative methods such as the Ponseti method
- the Ponseti method consists of manipulation and progressive casting which starts soon after birth. The deformity is usually corrected after 6-10 weeks. An Achilles tenotomy is required in around 85% of cases but this can usually be done under local anaesthetic
- night-time braces should be applied until the child is aged 4 years. The relapse rate is 15%

*reference: BMJ 2010; 340:c355: Current management of clubfoot. Bridgens J, Kiely N



Question 19 of 62

Next

A 57-year-old woman presents with a three month history of right-sided hip pain. This seems to have come on spontaneously without any obvious precipitating event. The pain is described as being worse on the 'outside' of the hip and is particularly bad at night when she lies on the right hand side.

On examination there is a full range of movement in the hip including internal and external rotation. Deep palpation of the lateral aspect of the right hip joint recreates the pain.

An x-ray of the right hip is reported as follows:

Right hip: Minor narrowing of the joint space otherwise normal appearance

What is the most likely diagnosis?

- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Fibromyalgia |
| <input type="radio"/> | B. Lumbar nerve root compression |
| <input checked="" type="radio"/> | C. Osteoarthritis |
| <input checked="" type="radio"/> | D. Greater trochanteric pain syndrome |
| <input type="radio"/> | E. Meralgia paraesthetica |

Next question

Greater trochanteric pain syndrome is now the preferred term for trochanteric bursitis.

Whilst the x-ray shows joint space narrowing this is not an uncommon finding. Osteoarthritis would also be less likely given the palpable nature of the pain and relatively short duration of symptoms.

Hip pain in adults

The table below provides a brief summary of the potential causes of hip pain in adults

Condition	Features
Osteoarthritis	Pain exacerbated by exercise and relieved by rest Reduction in internal rotation is often the first sign Age, obesity and previous joint problems are risk factors
Inflammatory arthritis	Pain in the morning Systemic features Raised inflammatory markers
Referred lumbar spine pain	Femoral nerve compression may cause referred pain in the hip Femoral nerve stretch test may be positive - lie the patient prone. Extend the hip joint with a straight leg then bend the knee. This stretches the femoral nerve and will cause pain if it is trapped
Greater trochanteric pain syndrome (Trochanteric bursitis)	Due to repeated movement of the fibroelastic iliotibial band Pain and tenderness over the lateral side of thigh Most common in women aged 50-70 years
Meralgia paraesthetica	Caused by compression of lateral cutaneous nerve of thigh Typically burning sensation over antero-lateral aspect of thigh
Avascular necrosis	Symptoms may be of gradual or sudden onset May follow high dose steroid therapy or previous hip fracture or dislocation
Pubic symphysis dysfunction	Common in pregnancy Ligament laxity increases in response to hormonal changes of pregnancy Pain over the pubic symphysis with radiation to the groins and the medial aspects of the thighs. A waddling gait may be seen
Transient idiopathic osteoporosis	An uncommon condition sometimes seen in the third trimester of pregnancy Groin pain associated with a limited range of movement in the hip Patients may be unable to weight bear ESR may be elevated

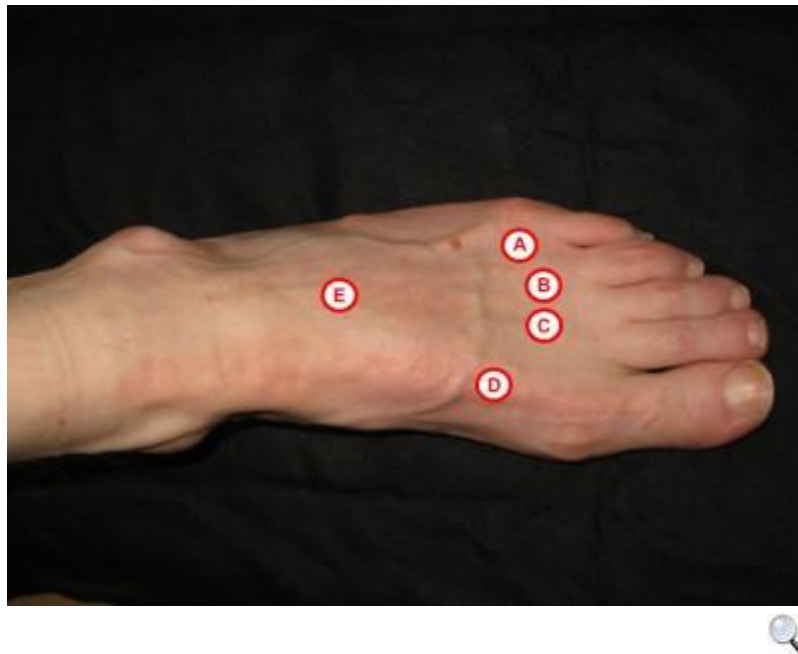
Condition	Features
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Question
20 of 62

Next

A 56-year-old man complains of pain in his foot. You suspect a diagnosis of Morton's neuroma.



Where is the pain most likely to be located?

- ☐ A. Marker A
- ✓ ☒ B. Marker B
- ☐ C. Marker C
- ☐ D. Marker D
- ✗ ☐ E. Marker E

Next question

Morton's neuroma

Morton's neuroma is a benign neuroma affecting the intermetatarsal plantar nerve, most commonly in the third inter-metatarsophalangeal space. The female to male ratio is around 4:1.

Features

- forefoot pain, most commonly in the third inter-metatarsophalangeal space
- worse on walking. May be described as a shooting or burning pain. Patients may feel they have a pebble in their shoe
- Mulder's click: one hand tries to hold the neuroma between the finger and thumb. The other hand squeezes the metatarsals together. A click may be heard as the neuroma moves between the metatarsal heads
- there may be loss of sensation distally in the toes

Diagnosis is usually clinical although ultrasound may be helpful in confirming the diagnosis

Management

- avoid high-heels
- metatarsal pad
- CKS recommends referral if symptoms persist for > 3 months despite footwear modifications and the use of metatarsal pads
- orthotists may give the patient a metatarsal dome orthotic
- other secondary care options include corticosteroid injection and neurectomy of the involved interdigital nerve and neuroma



Question 21 of 62

Next

A 40-year-old man presents with pain in his lower back and 'sciatica' for the past three days. He describes bending down to pick up a washing machine when he felt 'something go'. He now has severe pain radiating from his back down the right leg. On examination he describes paraesthesia over the anterior aspect of the right knee and the medial aspect of his calf. Power is intact and the right knee reflex is diminished. The femoral stretch test is positive on the right side. Which nerve root is most likely to be affected?



A. Common peroneal nerve

- ☐ B. Lateral cutaneous nerve of the thigh
- ☐ C. L5
- ☐ D. L3
- ☒ E. L4

Next question

Lower back pain: prolapsed disc

A prolapsed lumbar disc usually produces clear dermatomal leg pain associated with neurological deficits.

Features

- leg pain usually worse than back
- pain often worse when sitting

The table below demonstrates the expected features according to the level of compression:

Site of compression	Features
L3 nerve root compression	Sensory loss over anterior thigh Weak quadriceps Reduced knee reflex Positive femoral stretch test
L4 nerve root compression	Sensory loss anterior aspect of knee Weak quadriceps Reduced knee reflex Positive femoral stretch test
L5 nerve root compression	Sensory loss dorsum of foot Weakness in foot and big toe dorsiflexion Reflexes intact Positive sciatic nerve stretch test
S1 nerve root compression	Sensory loss posterolateral aspect of leg and lateral aspect of foot

Site of compression	Features
	Weakness in plantar flexion of foot Reduced ankle reflex Positive sciatic nerve stretch test

Management

- similar to that of other musculoskeletal lower back pain: analgesia, physiotherapy, exercises
- if symptoms persist then referral for consideration of MRI is appropriate



Question 22 of 62

Next

Which one of the following is not associated with carpal tunnel syndrome?



- ☐ A. Tinel's sign
- ☐ B. Compression of the median nerve
- ☒ C. Wasting of the hypothenar eminence
- ☐ D. Flexion of the wrist reproduces symptoms
- ☐ E. Weakness of thumb abduction

Next question

Carpal tunnel syndrome

Carpal tunnel syndrome is caused by compression of median nerve in the carpal tunnel.

History

- pain/pins and needles in thumb, index, middle finger
- unusually the symptoms may 'ascend' proximally

- patient shakes his hand to obtain relief, classically at night

Examination

- weakness of thumb abduction (abductor pollicis brevis)
- wasting of thenar eminence (NOT hypothenar)
- Tinel's sign: tapping causes paraesthesia
- Phalen's sign: flexion of wrist causes symptoms

Causes

- idiopathic
- pregnancy
- oedema e.g. heart failure
- lunate fracture
- rheumatoid arthritis

Electrophysiology

- motor + sensory: prolongation of the action potential

Treatment



- corticosteroid injection
- wrist splints at night
- surgical decompression (flexor retinaculum division)



Question 23 of 62

Next

A 59-year-old woman presents to surgery with a five day history of severe back pain. Her past medical history includes breast cancer and osteoarthritis. The back pain is located in the lower thoracic region, radiates round to the anterior chest and is made worse by coughing and sneezing. There has been no change in bowel habit or urinary symptoms. On examination there is diffuse tenderness in the lower thoracic region. Peri-anal sensation is normal and lower limb reflexes are brisk. Which one of the following is the most appropriate management plan?

	<input type="radio"/>	A. Organise outpatient MRI
	<input type="radio"/>	B. Oral paracetamol + exercise programme
	<input type="radio"/>	C. Oral paracetamol + urgent thoracic/lumbar spine x-ray
	<input type="radio"/>	D. Oral dexamethasone + urgent thoracic/lumbar spine x-ray
	<input checked="" type="radio"/>	E. Oral dexamethasone + immediate oncological assessment

Next question

This woman has spinal cord compression until proven otherwise and should have urgent assessment. Recent NICE guidelines suggest contacting the local metastatic spinal cord compression coordinator in this situation. This should hopefully prevent delays in treatment by ensuring the patient is admitted to the most appropriate place

Spinal cord compression

Spinal cord compression is an oncological emergency and affects up to 5% of cancer patients. Extradural compression accounts for the majority of cases, usually due to vertebral body metastases. It is more common in patients with lung, breast and prostate cancer

Features

- back pain - the earliest and most common symptom - may be worse on lying down and coughing
- lower limb weakness
- sensory changes: sensory loss and numbness
- neurological signs depend on the level of the lesion. Lesions above L1 usually result in upper motor neuron signs in the legs and a sensory level. Lesions below L1 usually cause lower motor neuron signs in the legs and perianal numbness. Tendon reflexes tend to be increased below the level of the lesion and absent at the level of the lesion

Management

- high-dose oral dexamethasone
- urgent oncological assessment for consideration of radiotherapy or surgery



Question 24 of 62

Next

Which one of the following is a risk factor for clubfoot?



A. Spina bifida



B. Maternal diabetes mellitus



C. Down's syndrome



D. Female gender



E. Polyhydramnios

Next question

Talipes equinovarus

Talipes equinovarus, or club foot, describes an inverted (inward turning) and plantar flexed foot. It is usually diagnosed on the newborn exam.

Talipes equinovarus is twice as common in males than females and has an incidence of 1 per 1,000 births. Around 50% of cases are bilateral.

Most commonly idiopathic. Associations include:

- spina bifida
- cerebral palsy
- Edward's syndrome (trisomy 18)
- oligohydramnios
- arthrogryposis

The diagnosis is clinical (the deformity is not passively correctable) and imaging is not normally needed.

Management*

- in recent years there has been a move away from surgical intervention to more conservative methods such as the Ponseti method
- the Ponseti method consists of manipulation and progressive casting which starts soon after birth. The deformity is usually corrected after 6-10 weeks. An Achilles tenotomy is required in around 85% of cases but this can usually be done under local anaesthetic
- night-time braces should be applied until the child is aged 4 years. The relapse rate is 15%

*reference: BMJ 2010; 340:c355: Current management of clubfoot. Bridgens J, Kiely N



Question 25 of 62

Next

A 55-year-old woman presents with a four week history of shoulder pain. There has been no obvious precipitating injury and no previous experience. The pain is worse on movement and there is a grating sensation if she moves the arm too quickly. She also gets pain at night, particularly when she lies on the affected shoulder. On examination there is no obvious erythema or swelling. Passive abduction is painful between between 60 and 120 degrees. She is unable to abduct the arm herself past 70-80 degrees. Flexion and extension are preserved. What is the most likely diagnosis?



- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Adhesive capsulitis (frozen shoulder) |
| <input checked="" type="radio"/> | B. Supraspinatus tendonitis |
| <input type="radio"/> | C. Acromioclavicular joint injury |
| <input type="radio"/> | D. Glenohumeral arthritis |
| <input type="radio"/> | E. Superior labral lesion |

Next question

This patient has a classic 'painful arc' which is a sign of shoulder impingement, most commonly secondary to supraspinatus tendonitis.

Rotator cuff muscles

SlitS - small t for teres minor

Supraspinatus

Infraspinatus
teres minor
Subscapularis

Muscle	Notes
Supraspinatus	aBDucts arm before deltoid Most commonly injured
Infraspinatus	Rotates arm laterally
teres minor	aDDucts & rotates arm laterally
Subscapularis	aDDuct & rotates arm medially

2 / 3

Question 26-28 of 62

Next

Theme: Hip pain in adults

- A. Inflammatory arthritis
- B. Trochanteric bursitis
- C. Pubic symphysis dysfunction
- D. Osteoarthritis
- E. Meralgia paraesthetica
- F. Avascular necrosis
- G. Transient idiopathic osteoporosis
- H. Referred lumbar spine pain
- I. Perthes' disease
- J. Slipped upper femoral epiphysis

For each one of the following scenarios please select the most likely diagnosis:

26. A 62-year-old man complains of pain in his right hip which is worse when he walks. Heberden's nodes are noted on examination of the distal interphalangeal joints

✓ Osteoarthritis

27. A 34-year-old man with a history of ulcerative colitis complains of pain and stiffness in his left hip which is worse in the mornings

✓ Inflammatory arthritis

28. A 29-year-old man who is a keen jogger complains of pain on the lateral aspect of his left hip. On examination there is a full range of movement but tenderness is noted on the anterolateral aspect of the joint

✗ You answered Slipped upper femoral epiphysis

The correct answer is Trochanteric bursitis

[Next question](#)

Hip pain in adults

The table below provides a brief summary of the potential causes of hip pain in adults

Condition	Features
Osteoarthritis	Pain exacerbated by exercise and relieved by rest Reduction in internal rotation is often the first sign Age, obesity and previous joint problems are risk factors
Inflammatory arthritis	Pain in the morning Systemic features Raised inflammatory markers
Referred lumbar spine pain	Femoral nerve compression may cause referred pain in the hip Femoral nerve stretch test may be positive - lie the patient prone. Extend the hip joint with a straight leg then bend the knee. This stretches the femoral nerve and will cause pain if it is trapped

Condition	Features
Greater trochanteric pain syndrome (Trochanteric bursitis)	Due to repeated movement of the fibroelastic iliotibial band Pain and tenderness over the lateral side of thigh Most common in women aged 50-70 years
Meralgia paraesthetica	Caused by compression of lateral cutaneous nerve of thigh Typically burning sensation over antero-lateral aspect of thigh
Avascular necrosis	Symptoms may be of gradual or sudden onset May follow high dose steroid therapy or previous hip fracture or dislocation
Pubic symphysis dysfunction	Common in pregnancy Ligament laxity increases in response to hormonal changes of pregnancy Pain over the pubic symphysis with radiation to the groins and the medial aspects of the thighs. A waddling gait may be seen
Transient idiopathic osteoporosis	An uncommon condition sometimes seen in the third trimester of pregnancy Groin pain associated with a limited range of movement in the hip Patients may be unable to weight bear ESR may be elevated



Question 29 of 62

Next

You are doing the six week check on a baby girl. Which one of the following best describes the Barlow test for developmental dysplasia of the hip?



- ☐ A. Attempts to relocate a dislocated femoral head
- ☐ B. Upward pressure on the femur with the hip flexed at 90 degrees
- ☐ C. Observation of the relative height of the knees with the hips flexed at 90 degrees
- ☐ D. Observation for buttock crease asymmetry with the hips flexed at 90 degrees
- ☒ E. Attempts to dislocate an articulated femoral head



Next question

Developmental dysplasia of the hip

Developmental dysplasia of the hip (DDH) is gradually replacing the old term 'congenital dislocation of the hip' (CDH). It affects around 1-3% of newborns.

Risk factors

- female sex: 6 times greater risk
- breech presentation
- positive family history
- firstborn children
- oligohydramnios
- birth weight > 5 kg
- congenital calcaneovalgus foot deformity

DDH is slightly more common in the left hip. Around 20% of cases are bilateral.

Clinical examination is made using the Barlow and Ortolani tests:

- Barlow test: attempts to dislocate an articulated femoral head
- Ortolani test: attempts to relocate a dislocated femoral head

Ultrasound is used to confirm the diagnosis if clinically suspected

Management

- most unstable hips will spontaneously stabilise by 3-6 weeks of age
- Pavlik harness (flexion-abduction orthosis) in children younger than 4-5 months
- older children may require surgery



Question 30 of 62

Next

A 64-year-old female with a history of rheumatoid arthritis presents with increased difficulty in walking. On examination there is weakness of ankle dorsiflexion and of the extensor hallucis longus

associated with loss of sensation on the lateral aspect of the lower leg. What is the most likely diagnosis?

- | | | |
|---|----------------------------------|----------------------------------|
|  | <input type="radio"/> | A. Tibial nerve palsy |
| | <input type="radio"/> | B. Obturator nerve palsy |
|  | <input checked="" type="radio"/> | C. Common peroneal nerve palsy |
| | <input type="radio"/> | D. Lateral cutaneous nerve palsy |
| | <input type="radio"/> | E. Pudendal nerve palsy |

[Next question](#)

Common peroneal nerve lesion

The sciatic nerve divides into the tibial and common peroneal nerves. Injury often occurs at the neck of the fibula

The most characteristic feature of a common peroneal nerve lesion is foot drop

Other features include:

- weakness of foot dorsiflexion
- weakness of foot eversion
- weakness of extensor hallucis longus
- sensory loss over the dorsum of the foot and the lower lateral part of the leg
- wasting of the anterior tibial and peroneal muscles



Question 31 of 62

[Next](#)

You review a middle-aged man with shoulder pain. He has limited movement of the right shoulder in all directions. Which of the following clinical findings is most consistent with a diagnosis of frozen shoulder (adhesive capsulitis)?

- | | | |
|---|-----------------------|---|
|  | <input type="radio"/> | A. Only active movement limited + internal rotation most affected |
|---|-----------------------|---|

- | | | |
|------------------------------------|----|---|
| <input type="radio"/> | B. | Active and passive movement limited + abduction most affected |
| ✓ <input checked="" type="radio"/> | C. | Active and passive movement limited + external rotation most affected |
| <input type="radio"/> | D. | Active and passive movement limited + internal rotation most affected |
| <input type="radio"/> | E. | Only active movement limited + external rotation most affected |

Next question

Adhesive capsulitis

Adhesive capsulitis (frozen shoulder) is a common cause of shoulder pain. It is most common in middle-aged females. The aetiology of frozen shoulder is not fully understood.

Associations

- diabetes mellitus: up to 20% of diabetics may have an episode of frozen shoulder

Features typically develop over days



- external rotation is affected more than internal rotation or abduction
- both active and passive movement are affected
- patients typically have a painful freezing phase, an adhesive phase and a recovery phase
- bilateral in up to 20% of patients
- the episode typically lasts between 6 months and 2 years

Management

- no single intervention has been shown to improve outcome in the long-term
- treatment options include NSAIDs, physiotherapy, oral corticosteroids and intra-articular corticosteroids



A newborn baby is noted to have bilateral clubfoot. What is the treatment of choice?

-  ☐ A. Manipulation and progressive casting starting after 3 months
- ☐ B. Surgical correction at 1 year
- ☐ C. Surgical correction at 6 months
-  ☒ D. Manipulation and progressive casting starting soon after birth
- ☐ E. Surgical correction at 3 months

Next question

Talipes equinovarus

Talipes equinovarus, or club foot, describes an inverted (inward turning) and plantar flexed foot. It is usually diagnosed on the newborn exam.

Talipes equinovarus is twice as common in males than females and has an incidence of 1 per 1,000 births. Around 50% of cases are bilateral.

Most commonly idiopathic. Associations include:

- spina bifida
- cerebral palsy
- Edward's syndrome (trisomy 18)
- oligohydramnios
- arthrogryposis

The diagnosis is clinical (the deformity is not passively correctable) and imaging is not normally needed.

Management*

- in recent years there has been a move away from surgical intervention to more conservative methods such as the Ponseti method

- the Ponseti method consists of manipulation and progressive casting which starts soon after birth. The deformity is usually corrected after 6-10 weeks. An Achilles tenotomy is required in around 85% of cases but this can usually be done under local anaesthetic
- night-time braces should be applied until the child is aged 4 years. The relapse rate is 15%

*reference: BMJ 2010; 340:c355: Current management of clubfoot. Bridgens J, Kiely N

0 / 3 **Question 33-35 of 62**

Next

Theme: Lower back pain: prolapsed disc

A.	L2
B.	L3
C.	L4
D.	L5
E.	S1
F.	S2
G.	S3

For each one of the following scenarios select the nerve root which is most likely to be compressed:

- 33.** A 52-year-old woman develops pain shooting down the posterior aspect of the left leg. On examination she has reduced sensation on the lateral aspect of the left foot and weakness of left foot plantar flexion.

 You answered L5

The correct answer is S1

- 34.** A 31-year-old man with sudden onset back pain radiating to the anterior aspect of his right knee. Examination reveals an absent knee jerk with reduced sensation over the patella and the medial aspect of his calf. The quadriceps are also noted to be weak on the affected side.

 You answered L3

The correct answer is L4

35. A 44-year-old man complains of pain radiating from his left hip to foot for the past week. On examination all reflexes are intact and the only positive finding is weak dorsiflexion of the left big toe

 You answered L4

The correct answer is L5

The clue here is normal reflexes - this excludes L3,L4 (knee) and S1,S2 (ankle)

[Next question](#)

Lower back pain: prolapsed disc

A prolapsed lumbar disc usually produces clear dermatomal leg pain associated with neurological deficits.

Features

- leg pain usually worse than back
- pain often worse when sitting

The table below demonstrates the expected features according to the level of compression:

Site of compression	Features
L3 nerve root compression	Sensory loss over anterior thigh Weak quadriceps Reduced knee reflex Positive femoral stretch test
L4 nerve root compression	Sensory loss anterior aspect of knee Weak quadriceps Reduced knee reflex Positive femoral stretch test
L5 nerve root compression	Sensory loss dorsum of foot

Site of compression	Features
	Weakness in foot and big toe dorsiflexion Reflexes intact Positive sciatic nerve stretch test
S1 nerve root compression	Sensory loss posterolateral aspect of leg and lateral aspect of foot Weakness in plantar flexion of foot Reduced ankle reflex Positive sciatic nerve stretch test

Management

- similar to that of other musculoskeletal lower back pain: analgesia, physiotherapy, exercises
- if symptoms persist then referral for consideration of MRI is appropriate



Question 36 of 62

Next

Which one of the following statements regarding joint replacement surgery is correct?



- ☒ **A.** Following a hip replacement patients should avoid crossing their legs
- ☐ **B.** Hip resurfacing is now the most common type of hip replacement operation performed in the UK
- ☐ **C.** Patients should be encouraged to avoid using walking sticks in weeks 2-6 following a hip operation
- ☐ **D.** Patients who are under the age of 60 years should be discouraged from having joint replacement surgery
- ☐ **E.** Hip replacement surgery should not be offered to patients with a BMI > 28 kg/m²

Next question

This is to reduce the chance of dislocation.

Osteoarthritis: joint replacement

Joint replacement (arthroplasty) remains the most effective treatment for osteoarthritis patients who

experience significant pain.

Selection criteria

- around 25% of patients are now younger than 60-years-old
- whilst obesity is often thought to be a barrier to joint replacement there is only a slight increase in short-term complications. There is no difference in long-term joint replacement survival

Surgical techniques

- for hips the most common type of operation is a cemented hip replacement. A metal femoral component is cemented into the femoral shaft. This is accompanied by a cemented acetabular polyethylene cup
- uncemented hip replacements are becoming increasingly popular, particularly in younger more active patients. They are more expensive than conventional cemented hip replacements
- hip resurfacing is also sometimes used where a metal cap is attached over the femoral head. This is often used in younger patients and has the advantage that the femoral neck is preserved which may be useful if conventional arthroplasty is needed later in life

Post-operative recovery

- patients receive both physiotherapy and a course of home-exercises
- walking sticks or crutches are usually used for up to 6 weeks after hip or knee replacement surgery

Patients who have had a hip replacement operation should receive basic advice to minimise the risk of dislocation:

- avoiding flexing the hip > 90 degrees
- avoid low chairs
- do not cross your legs
- sleep on your back for the first 6 weeks

Complications

- wound and joint infection

- thromboembolism: NICE recommend patients receive low-molecular weight heparin for 4 weeks following a hip replacement
- dislocation



Question 37 of 62

Next

Which one of the following statements regarding Morton's neuroma is correct?



A. Occurs most commonly in the second inter-metatarsophalangeal space



B. They may be a distal neurological deficit



C. They are more common in patients who have multiple sclerosis



D. Has malignant potential in around 1% of patients



E. There is roughly equal incidence in males and females

Next question

Morton's neuroma

Morton's neuroma is a benign neuroma affecting the intermetatarsal plantar nerve, most commonly in the third inter-metatarsophalangeal space. The female to male ratio is around 4:1.

Features

- forefoot pain, most commonly in the third inter-metatarsophalangeal space
- worse on walking. May be described as a shooting or burning pain. Patients may feel they have a pebble in their shoe
- Mulder's click: one hand tries to hold the neuroma between the finger and thumb. The other hand squeezes the metatarsals together. A click may be heard as the neuroma moves between the metatarsal heads
- there may be loss of sensation distally in the toes

Diagnosis is usually clinical although ultrasound may be helpful in confirming the diagnosis

Management

- avoid high-heels
- metatarsal pad
- CKS recommends referral if symptoms persist for > 3 months despite footwear modifications and the use of metatarsal pads
- orthotists may give the patient a metatarsal dome orthotic
- other secondary care options include corticosteroid injection and neurectomy of the involved interdigital nerve and neuroma



Question 38 of 62

Next

A 21-year-old female presents with chronic left knee pain. The pain is typically felt after jogging. There is also intermittent swelling and locking of the same joint. What is the most likely diagnosis?



- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Chondromalacia patellae |
| <input type="radio"/> | B. Osteosarcoma |
| <input type="radio"/> | C. Juvenile idiopathic arthritis |
| <input checked="" type="radio"/> | D. Osteochondritis dissecans |
| <input type="radio"/> | E. Osgood-Schlatter disease |



Next question

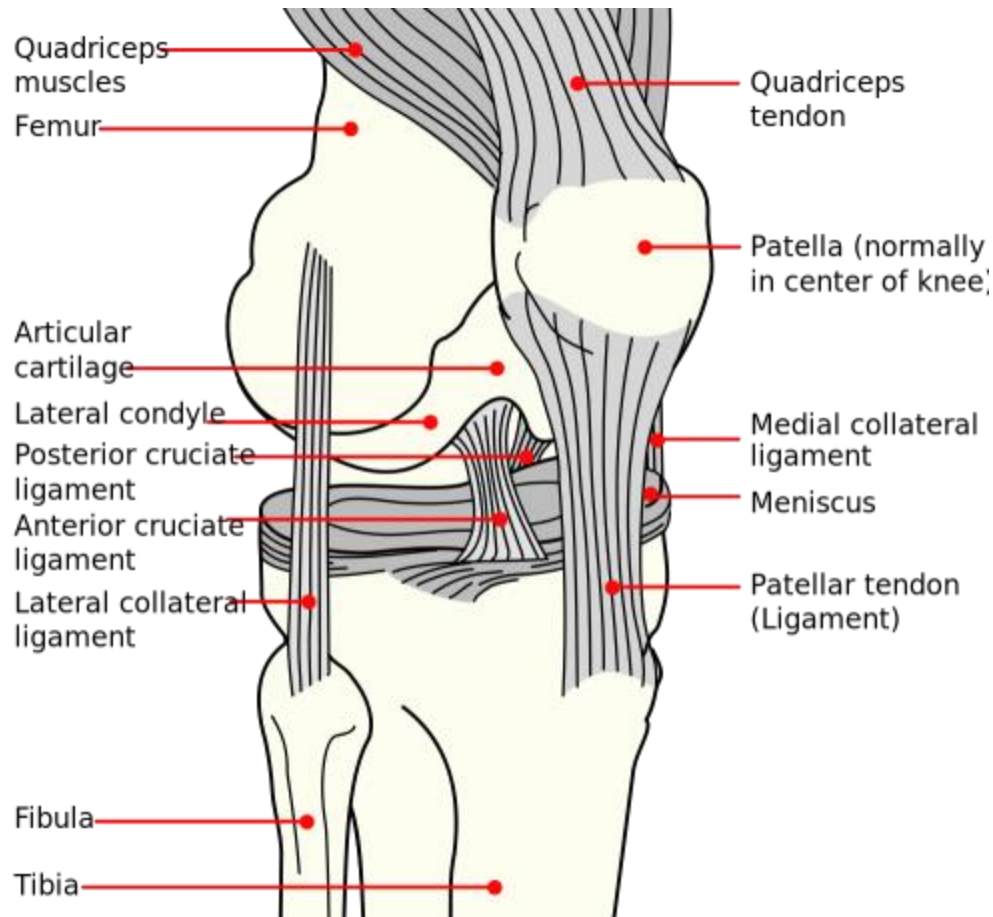
Knee problems: children and young adults

The table below summarises the key features of common knee problems:

Condition	Key features
-----------	--------------

Condition	Key features
Chondromalacia patellae	Softening of the cartilage of the patella Common in teenage girls Characteristically anterior knee pain on walking up and down stairs and rising from prolonged sitting Usually responds to physiotherapy
Osgood-Schlatter disease (tibial apophysitis)	Seen in sporty teenagers Pain, tenderness and swelling over the tibial tubercle
Osteochondritis dissecans	Pain after exercise Intermittent swelling and locking
Patellar subluxation	Medial knee pain due to lateral subluxation of the patella Knee may give way
Patellar tendonitis	More common in athletic teenage boys Chronic anterior knee pain that worsens after running Tender below the patella on examination

Referred pain may come from hip problems such as slipped upper femoral epiphysis



Question 39 of 62

Next

Following the 2009 NICE low back pain guidelines, which of the following treatment options should initially be offered to patients:



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Exercise programme OR manual therapy OR cognitive behavioural therapy |
| <input type="radio"/> | B. Acupuncture OR physiotherapy OR referral to the pain management clinic |
| <input type="radio"/> | C. Acupuncture OR physiotherapy OR exercise-prescription |
| <input checked="" type="radio"/> | D. Exercise programme OR manual therapy OR acupuncture |





E. Exercise programme OR physiotherapy OR cognitive behavioural therapy

[Next question](#)

Lower back pain: investigation and management

Much of the following is based on the 2009 NICE low back pain guidelines. They apply to patients with non-specific lower back pain (i.e. not due to malignancy, infection, trauma etc) that has lasted for more than 6 weeks and less than 12 months.

Investigation

- lumbar spine x-ray should not be offered
- MRI should only be offered to patients with non-specific back pain where spinal fusion is being considered and to patients where malignancy, infection, fracture, cauda equina or ankylosing spondylitis is suspected

Advice to people with low back pain

- try to encourage self-management
- stay physically active and exercise

Analgesia

- paracetamol is first-line
- proton pump inhibitors should be co-prescribed for patients over the age of 45 years who are given NSAIDs
- tricyclic antidepressants should be considered if other medications are insufficient
- strong opioids should be considered for short-term use

NICE suggest that one of the following three treatments should be offered:

- exercise programme
- manual therapy
- acupuncture

Patients who have received at least one of the above treatments and who have high disability and/or psychological distress should be considered for a combined physical and psychological treatment programme, comprising around 100 hours over a maximum of 8 weeks.

Exercise programme

- up to 8 sessions over up to 12 weeks
- supervised group exercise

Manual therapy

- up to 9 sessions over up to 12 weeks
- includes spinal manipulation, spinal mobilisation and massage
- spinal manipulation can be performed by chiropractors and osteopaths, and doctors/physiotherapists who have undergone specialist training

Acupuncture

- up to 10 sessions over up to 12 weeks

0 / 3 **Question 40-42 of 62**

[Next](#)

Theme: Venous thromboembolism prophylaxis

A.	5 days
B.	7 days
C.	8-9 days
D.	10-14 days
E.	15-21 days
F.	28-35 days
G.	36-42 days
H.	43-54 days
I.	No post-procedure prophylaxis required

For each of the following conditions/procedures please select the required duration of venous thromboembolism prophylaxis after the procedure:

40. Elective hip replacement

 You answered 10-14 days

The correct answer is 28-35 days

41. Elective knee replacement

 You answered 36-42 days

The correct answer is 10-14 days

42. Hip fracture

 You answered 43-54 days

The correct answer is 28-35 days

[Next question](#)

Venous thromboembolism: prophylaxis in patients admitted to hospital

Venous thromboembolism (VTE) still accounts for a significant proportion of avoidable hospital deaths. In an effort to tackle this problem NICE produced guidelines in 2010.

Before admission

- advise women to consider stopping oestrogen-containing oral contraception or HRT 4 weeks before surgery.
- assess the risks and benefits of stopping antiplatelet therapy 1 week before surgery.

The following patients are deemed at risk of VTE

Medical patients

- if mobility significantly reduced for ≥ 3 days **or**
- if expected to have ongoing reduced mobility relative to normal state plus any VTE risk factor (see below)

Surgical patients and patients with trauma

- if total anaesthetic + surgical time > 90 minutes **or**
- if surgery involves pelvis or lower limb and total anaesthetic + surgical time > 60 minutes **or**
- if acute surgical admission with inflammatory or intra-abdominal condition **or**
- if expected to have significant reduction in mobility **or**
- if any VTE risk factor present (see below)

VTE risk factors

- active cancer or cancer treatment
- age > 60 years
- critical care admission
- dehydration
- known thrombophilias
- obesity ($\text{BMI} > 30 \text{ kg/m}^2$)
- one or more significant medical comorbidities (for example: heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)
- personal history or first-degree relative with a history of VTE
- use of HRT
- use of oestrogen-containing contraceptive therapy
- varicose veins with phlebitis

In-patient VTE prophylaxis

As a general rule pharmacological VTE prophylaxis is used for medical patients unless there is a contraindication.

For surgical patients mechanical VTE prophylaxis is offered for patients at risk. Pharmacological

VTE prophylaxis is also given for if the risk of major bleeding is low.

Pharmacological VTE prophylaxis options:

- fondaparinux sodium
- low molecular weight heparin (LMWH)
- unfractionated heparin (UFH) (for patients with renal failure)

Mechanical VTE prophylaxis options:

- anti-embolism stockings (thigh or knee length)
- foot impulse devices
- intermittent pneumatic compression devices (thigh or knee length)

Post-procedure VTE prophylaxis

For certain procedures pharmacological VTE prophylaxis is recommended for all patients, using one of the following:

- dabigatran, started 14 hours after surgery
- fondaparinux, started 6 hours after surgery
- LMWH, started 6-12 hours after surgery
- rivaroxaban, started 6-10 hours after surgery.

Procedure	Length of prophylaxis
Elective hip	28-35 days
Elective knee	10-14 days
Hip fracture	28-35 days



Question 43 of 62

Next

A 52-year-old female presents to surgery with weakness and pins and needles in her right hand. On examination she has wasting of the thenar eminence associated with sensory loss to the palmar aspect of lateral (radial) three fingers. Which nerve is likely to be affected?

	<input type="radio"/>	A. Common peroneal nerve
	<input checked="" type="radio"/>	B. Median nerve
	<input type="radio"/>	C. Radial nerve
	<input type="radio"/>	D. Anterior interosseous nerve
	<input type="radio"/>	E. Ulnar nerve

[Next question](#)

This patient most probably has carpal tunnel syndrome

Median nerve

Overview

- arises from lateral and medial cords of the brachial plexus (C6-8, T1)

Motor to (LOAF)

- Lateral two lumbricals
- Opponens pollicis
- Abductor pollicis brevis
- Flexor pollicis brevis
- the above three form the thenar eminence muscles
- also supplies flexor muscles of the forearm

Sensory to

- palmar aspect of lateral (radial) 3 1/2 fingers

Patterns of damage

Damage at wrist

- e.g. carpal tunnel syndrome
- paralysis and wasting of thenar eminence muscles

- sensory loss to palmar aspect of lateral (radial) 3 1/2 fingers

Damage at elbow, as above plus:

- unable to pronate forearm
- weak wrist flexion
- ulnar deviation of wrist

Anterior interosseous nerve (branch of median nerve)

- leaves just below the elbow
- results in loss of pronation of forearm and weakness of long flexors of thumb and index finger



Question 44 of 62

Next

A 33-year-old woman presents with back pain which radiates down her right leg. This came on suddenly when she was bending down to pick up her child. On examination straight leg raising is limited to 30 degrees on the right hand side due to shooting pains down her leg. Sensation is reduced on the dorsum of the right foot, particularly around the big toe and foot dorsiflexion is also weak. The ankle and knee reflexes appear intact. A diagnosis of disc prolapse is suspected. Which nerve root is most likely to be affected?



<input type="radio"/>	A. L2
<input type="radio"/>	B. L3
<input type="radio"/>	C. L4
<input checked="" type="radio"/>	D. L5
<input type="radio"/>	E. S1

Next question

L5 lesion features = loss of foot dorsiflexion + sensory loss dorsum of the foot

Lower back pain: prolapsed disc

A prolapsed lumbar disc usually produces clear dermatomal leg pain associated with neurological deficits.

Features

- leg pain usually worse than back
- pain often worse when sitting

The table below demonstrates the expected features according to the level of compression:

Site of compression	Features
L3 nerve root compression	Sensory loss over anterior thigh Weak quadriceps Reduced knee reflex Positive femoral stretch test
L4 nerve root compression	Sensory loss anterior aspect of knee Weak quadriceps Reduced knee reflex Positive femoral stretch test
L5 nerve root compression	Sensory loss dorsum of foot Weakness in foot and big toe dorsiflexion Reflexes intact Positive sciatic nerve stretch test
S1 nerve root compression	Sensory loss posterolateral aspect of leg and lateral aspect of foot Weakness in plantar flexion of foot Reduced ankle reflex Positive sciatic nerve stretch test

Management

- similar to that of other musculoskeletal lower back pain: analgesia, physiotherapy, exercises
- if symptoms persist then referral for consideration of MRI is appropriate



Question 45 of 62

Next

A 40-year-old woman complains of a permanent 'funny-bone' sensation in her right elbow. This is accompanied by tingling in the little and ring finger. Her symptoms are worse when the elbow is bent for prolonged periods. What is the most likely diagnosis?



- ☒ A. Cubital tunnel syndrome
- ☐ B. Lateral epicondylitis
- ☒ C. Medial epicondylitis
- ☐ D. Median nerve entrapment syndrome
- ☐ E. Radial tunnel syndrome

Next question

Elbow pain

The table below details some of the characteristic features of conditions causing elbow pain:

	Features
Lateral epicondylitis (tennis elbow)	<ul style="list-style-type: none"> • pain and tenderness localised to the lateral epicondyle • pain worse on resisted wrist extension with the elbow extended or supination of the forearm with the elbow extended • episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks
Medial epicondylitis	Features

Lateral epicondylitis (tennis elbow)	<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • pain and tenderness localised to the lateral epicondyle • pain worse on resisted wrist extension with the elbow extended or supination of the forearm with the elbow extended • episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks
(golfer's elbow)	<ul style="list-style-type: none"> • pain and tenderness localised to the medial epicondyle • pain is aggravated by wrist flexion and pronation • symptoms may be accompanied by numbness / tingling in the 4th and 5th finger due to ulnar nerve involvement
Radial tunnel syndrome	<p>Most commonly due to compression of the posterior interosseous branch of the radial nerve. It is thought to be a result of overuse.</p> <p>Features</p> <ul style="list-style-type: none"> • symptoms are similar to lateral epicondylitis making it difficult to diagnose • however, the pain tends to be around 4-5 cm distal to the lateral epicondyle • symptoms may be worsened by extending the elbow and pronating the forearm
Cubital tunnel syndrome	<p>Due to the compression of the ulnar nerve.</p> <p>Features</p> <ul style="list-style-type: none"> • initially intermittent tingling in the 4th and 5th finger • may be worse when the elbow is resting on a firm surface or flexed for extended periods • later numbness in the 4th and 5th finger with associated weakness
Olecranon bursitis	<p>Swelling over the posterior aspect of the elbow. There may be associated pain, warmth and erythema. It typically affects middle-aged male patients.</p>



A 47-year-old female presents to her GP concerned about elbow pain. She has just spent the weekend painting the house. On examination there is localised pain around the lateral epicondyle and a diagnosis of lateral epicondylitis is suspected. Which one of the following movements would characteristically worsen the pain?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Resisted thumb flexion |
| <input type="radio"/> | B. Thumb extension |
| <input type="radio"/> | C. Flexion of the elbow |
| <input type="radio"/> | D. Pronation of the forearm with the elbow flexed |
| <input checked="" type="radio"/> | E. Resisted wrist extension with the elbow extended |



Next question

Lateral epicondylitis: worse on resisted wrist extension/supination whilst elbow extended

Lateral epicondylitis

Lateral epicondylitis typically follows unaccustomed activity such as house painting or playing tennis ('tennis elbow'). It is most common in people aged 45-55 years and typically affects the dominant arm.

Features

- pain and tenderness localised to the lateral epicondyle
- pain worse on wrist extension against resistance with the elbow extended or supination of the forearm with the elbow extended
- episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks

Management options

- advice on avoiding muscle overload

- simple analgesia
- steroid injection
- physiotherapy



Question 47 of 62

Next

Which one of the following statements regarding the NICE guidelines on the management of low back pain is correct?



<input type="radio"/>	A. Lumbar spine x-ray should be considered for patients who are suspected of having underlying osteomyelitis
<input checked="" type="radio"/>	B. Spinal manipulation should be offered as one of the treatment options
<input type="radio"/>	C. Selective serotonin reuptake inhibitors should be used in preference to tricyclic antidepressants for irretractable pain
<input type="radio"/>	D. Muscle relaxants such as diazepam should be considered for patients with a suspect anxiety element
<input type="radio"/>	E. Exercise programmes consist of up to 20 sessions over up to 26 weeks

Next question

Lower back pain: investigation and management

Much of the following is based on the 2009 NICE low back pain guidelines. They apply to patients with non-specific lower back pain (i.e. not due to malignancy, infection, trauma etc) that has lasted for more than 6 weeks and less than 12 months.

Investigation

- lumbar spine x-ray should not be offered
- MRI should only be offered to patients with non-specific back pain where spinal fusion is being considered and to patients where malignancy, infection, fracture, cauda equina or ankylosing spondylitis is suspected

Advice to people with low back pain

- try to encourage self-management
- stay physically active and exercise

Analgesia

- paracetamol is first-line
- proton pump inhibitors should be co-prescribed for patients over the age of 45 years who are given NSAIDs
- tricyclic antidepressants should be considered if other medications are insufficient
- strong opioids should be considered for short-term use

NICE suggest that one of the following three treatments should be offered:

- exercise programme
- manual therapy
- acupuncture

Patients who have received at least one of the above treatments and who have high disability and/or psychological distress should be considered for a combined physical and psychological treatment programme, comprising around 100 hours over a maximum of 8 weeks.

Exercise programme

- up to 8 sessions over up to 12 weeks
- supervised group exercise

Manual therapy

- up to 9 sessions over up to 12 weeks
- includes spinal manipulation, spinal mobilisation and massage
- spinal manipulation can be performed by chiropractors and osteopaths, and doctors/physiotherapists who have undergone specialist training

Acupuncture

- up to 10 sessions over up to 12 weeks



Question 48 of 62

Next

What is the first-line treatment for Morton's neuroma?



A. Avoid high heels + supinatory insoles + NSAIDs



B. Avoid high heels + supinatory insoles



C. Avoid high heels + physiotherapy



D. Avoid high heels + NSAIDs



E. Avoid high heels + metatarsal pads

Next question

Clinical Knowledge Summaries do not recommend the routine use of NSAIDs for patients with Morton's neuroma

Morton's neuroma

Morton's neuroma is a benign neuroma affecting the intermetatarsal plantar nerve, most commonly in the third inter-metatarsophalangeal space. The female to male ratio is around 4:1.

Features

- forefoot pain, most commonly in the third inter-metatarsophalangeal space
- worse on walking. May be described as a shooting or burning pain. Patients may feel they have a pebble in their shoe
- Mulder's click: one hand tries to hold the neuroma between the finger and thumb. The other hand squeezes the metatarsals together. A click may be heard as the neuroma moves between the metatarsal heads
- there may be loss of sensation distally in the toes

Diagnosis is usually clinical although ultrasound may be helpful in confirming the diagnosis

Management

- avoid high-heels
- metatarsal pad

- CKS recommends referral if symptoms persist for > 3 months despite footwear modifications and the use of metatarsal pads
- orthotists may give the patient a metatarsal dome orthotic
- other secondary care options include corticosteroid injection and neurectomy of the involved interdigital nerve and neuroma



Question 49 of 62

Next

Which one of the following statements regarding slipped upper femoral epiphysis is true?



<input type="radio"/>	A. Suprapubic pain is the most common symptom
<input checked="" type="radio"/>	B. A chronic slip, with symptoms over weeks to months is the most common presentation
<input type="radio"/>	C. Typical age group is 5-10 years
<input type="radio"/>	D. More common in girls
<input type="radio"/>	E. Bilateral in less than 5% of cases

Next question

Hip problems in children

The table below provides a brief summary of the potential causes of hip problems in children

Condition	Notes
Development dysplasia of the hip	Often picked up on newborn examination Barlow's test, Ortolani's test are positive Unequal skin folds/leg length
Transient synovitis (irritable hip)	Typical age group = 2-10 years Acute hip pain associated with viral infection Commonest cause of hip pain in children
Perthes disease	Perthes disease is a degenerative condition affecting the hip joints of children, typically

Condition	Notes
	<p>between the ages of 4-8 years. It is due to avascular necrosis of the femoral head</p> <p>Perthes disease is 5 times more common in boys. Around 10% of cases are bilateral</p> <p>Features</p> <ul style="list-style-type: none"> • hip pain: develops progressively over a few weeks • limp • stiffness and reduced range of hip movement • x-ray: early changes include widening of joint space, later changes include decreased femoral head size/flattening
Slipped upper femoral epiphysis	<p>Typical age group = 10-15 years</p> <p>More common in obese children and boys</p> <p>Displacement of the femoral head epiphysis postero-inferiorly</p> <p>Bilateral slip in 20% of cases</p> <p>May present acutely following trauma or more commonly with chronic, persistent symptoms</p> <p>Features</p> <ul style="list-style-type: none"> • knee or distal thigh pain is common • loss of internal rotation of the leg in flexion
Juvenile idiopathic arthritis (JIA)	<p>Preferred to the older term juvenile chronic arthritis, describes arthritis occurring in someone who is less than 16 years old that lasts for more than three months. Pauciarticular JIA refers to cases where 4 or less joints are affected. It accounts for around 60% of cases of JIA</p> <p>Features of pauciarticular JIA</p> <ul style="list-style-type: none"> • joint pain and swelling: usually medium sized joints e.g. knees, ankles, elbows • limp • ANA may be positive in JIA - associated with anterior uveitis
Septic arthritis	<p>Acute hip pain associated with systemic upset e.g. pyrexia. Inability/severe limitation of affected joint</p>

Image gallery



© Image used on license from [Radiopaedia](#)



Perthes disease - both femoral epiphyses show extensive destruction, the acetabula are deformed



© Image used on license from [Radiopaedia](#)



Perthes disease - bilateral disease



© Image used on license from [Radiopaedia](#)



Slipped upper femoral epiphysis - left side





Slipped upper femoral epiphysis - left side

**Question 50 of 62**

Next

A 24-year-old man is investigated for chronic back pain. Which one of the following would most suggest a diagnosis of ankylosing spondylitis?



<input checked="" type="radio"/>	A. Reduced lateral flexion of the lumbar spine
<input type="radio"/>	B. Pain gets worse during the day
<input type="radio"/>	C. Accentuated lumbar lordosis
<input type="radio"/>	D. Pain on straight leg raising
<input type="radio"/>	E. Loss of thoracic kyphosis

Next question

Reduced lateral flexion of the lumbar spine is one of the earliest signs of ankylosing spondylitis. There tends to be a loss of lumbar lordosis and an accentuated thoracic kyphosis in patients with ankylosing spondylitis

Ankylosing spondylitis: features

Ankylosing spondylitis is a HLA-B27 associated spondyloarthropathy. It typically presents in males (sex ratio 5:1) aged 20-30 years old.

Features

- typically a young man who presents with lower back pain and stiffness of insidious onset
- stiffness is usually worse in the morning and improves with exercise
- the patient may experience pain at night which improves on getting up

Clinical examination

- reduced lateral flexion
- reduced forward flexion - Schober's test - a line is drawn 10 cm above and 5 cm below the back dimples (dimples of Venus). The distance between the two lines should increase by more than 5 cm when the patient bends as far forward as possible
- reduced chest expansion

Other features - the 'A's

- Apical fibrosis
- Anterior uveitis
- Aortic regurgitation
- Achilles tendonitis
- AV node block
- Amyloidosis
- and cauda equina syndrome
- peripheral arthritis (25%, more common if female)



Question 51 of 62

Next

Which one of the following statements regarding developmental dysplasia of the hip is true?



<input checked="" type="radio"/>	A. Affects around 5% of newborns
<input type="radio"/>	B. Birth weight less than 3 kg is a risk factor
<input checked="" type="radio"/>	C. 20% of cases are bilateral
<input type="radio"/>	D. The Ortolani test attempts to dislocate an articulated femoral head
<input type="radio"/>	E. Polyhydramnios is a risk factor

Next question

Developmental dysplasia of the hip

Developmental dysplasia of the hip (DDH) is gradually replacing the old term 'congenital dislocation of the hip' (CDH). It affects around 1-3% of newborns.

Risk factors

- female sex: 6 times greater risk
- breech presentation
- positive family history
- firstborn children
- oligohydramnios
- birth weight > 5 kg
- congenital calcaneovalgus foot deformity

DDH is slightly more common in the left hip. Around 20% of cases are bilateral.

Clinical examination is made using the Barlow and Ortolani tests:

- Barlow test: attempts to dislocate an articulated femoral head
- Ortolani test: attempts to relocate a dislocated femoral head

Ultrasound is used to confirm the diagnosis if clinically suspected

Management

- most unstable hips will spontaneously stabilise by 3-6 weeks of age
- Pavlik harness (flexion-abduction orthosis) in children younger than 4-5 months
- older children may require surgery



Question 52 of 62

Next

Please look at the image below:



Which one of the following statements regarding this condition is true?



- | | |
|----------------------------------|--|
| <input checked="" type="radio"/> | A. The majority of cases are idiopathic |
| <input type="radio"/> | B. It is most commonly diagnosed at the six-week check |
| <input type="radio"/> | C. It is bilateral in 80-90% of cases |
| <input type="radio"/> | D. The incidence is 5 per 1,000 live births |
| <input type="radio"/> | E. X-rays should be performed to confirm the diagnosis |

[Next question](#)

Talipes equinovarus

Talipes equinovarus, or club foot, describes an inverted (inward turning) and plantar flexed foot. It is usually diagnosed on the newborn exam.

Talipes equinovarus is twice as common in males than females and has an incidence of 1 per 1,000 births. Around 50% of cases are bilateral.

Most commonly idiopathic. Associations include:

- spina bifida
- cerebral palsy
- Edward's syndrome (trisomy 18)
- oligohydramnios
- arthrogryposis

The diagnosis is clinical (the deformity is not passively correctable) and imaging is not normally needed.

Management*

- in recent years there has been a move away from surgical intervention to more conservative methods such as the Ponseti method
- the Ponseti method consists of manipulation and progressive casting which starts soon after birth. The deformity is usually corrected after 6-10 weeks. An Achilles tenotomy is required in around 85% of cases but this can usually be done under local anaesthetic
- night-time braces should be applied until the child is aged 4 years. The relapse rate is 15%

*reference: BMJ 2010; 340:c355: Current management of clubfoot. Bridgens J, Kiely N



Question 53 of 62

Next

A patient is noted to have an absent triceps reflex. Which nerve root does this correspond to?



<input checked="" type="radio"/>	A. C7-C8
<input type="radio"/>	B. C5-C6
<input type="radio"/>	C. C3-C4
<input type="radio"/>	D. C6-C7



E. C5-C7

Next question

Reflexes

The common reflexes are listed below:

Reflex	Root
Ankle	S1-S2
Knee	L3-L4
Biceps	C5-C6
Triceps	C7-C8



Question 54 of 62

Next

A 23-year-old canoeist presents with pain in the right distal dorsoradial forearm, around 5-10 cm from the wrist joint. On examination the area is slightly erythematous and swollen. Crepitus can be felt when the patient moves his right hand. What is the most likely diagnosis?



A. Carpo-metacarpal osteoarthritis



B. Carpal tunnel syndrome



C. De Quervain's tenosynovitis



D. Intersection syndrome



E. Ganglion cyst

Next question

Intersection syndrome

Intersection syndrome is a tenosynovitis caused by inflammation where the abductor pollicis longus and extensor pollicis brevis muscles cross over (or intersect) the tendons of the extensor carpi radialis longus and the extensor carpi radialis brevis.

Features

- intersection syndrome is commonly misdiagnosed as de Quervain's tenosynovitis
- pain in the distal dorsoradial forearm, around 5-10 cm proximal of the wrist joint
- swelling and erythema may be seen

Intersection syndrome is commonly seen in skiers, tennis players, weight lifters and canoeists.

Management

- NSAIDs
- steroid injection
- physiotherapy
- surgical treatment is rarely required



Question 55 of 62

Next

A 50-year-old woman complains of pain in her right elbow. This has been present for the past four weeks and is maximal around 4-5cm distal from the lateral aspect of the elbow joint. The pain is made worse by extending the elbow and pronating the forearm. What is the most likely diagnosis?



<input type="radio"/>	A. Lateral epicondylitis
<input checked="" type="radio"/>	B. Radial tunnel syndrome
<input type="radio"/>	C. De Quervain's tenosynovitis
<input type="radio"/>	D. Cubital tunnel syndrome



E. Medial epicondylitis

[Next question](#)

Elbow pain

The table below details some of the characteristic features of conditions causing elbow pain:

	Features
Lateral epicondylitis (tennis elbow)	<ul style="list-style-type: none">• pain and tenderness localised to the lateral epicondyle• pain worse on resisted wrist extension with the elbow extended or supination of the forearm with the elbow extended• episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks
Medial epicondylitis (golfer's elbow)	<p>Features</p> <ul style="list-style-type: none">• pain and tenderness localised to the medial epicondyle• pain is aggravated by wrist flexion and pronation• symptoms may be accompanied by numbness / tingling in the 4th and 5th finger due to ulnar nerve involvement
Radial tunnel syndrome	<p>Most commonly due to compression of the posterior interosseous branch of the radial nerve. It is thought to be a result of overuse.</p> <p>Features</p> <ul style="list-style-type: none">• symptoms are similar to lateral epicondylitis making it difficult to diagnose• however, the pain tends to be around 4-5 cm distal to the lateral epicondyle• symptoms may be worsened by extending the elbow and pronating the forearm
Cubital tunnel syndrome	<p>Due to the compression of the ulnar nerve.</p> <p>Features</p> <ul style="list-style-type: none">• initially intermittent tingling in the 4th and 5th finger• may be worse when the elbow is resting on a firm surface or flexed for

Lateral epicondylitis (tennis elbow)	<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • pain and tenderness localised to the lateral epicondyle • pain worse on resisted wrist extension with the elbow extended or supination of the forearm with the elbow extended • episodes typically last between 6 months and 2 years. Patients tend to have acute pain for 6-12 weeks
	<p>extended periods</p> <ul style="list-style-type: none"> • later numbness in the 4th and 5th finger with associated weakness
Olecranon bursitis	<p>Swelling over the posterior aspect of the elbow. There may be associated pain, warmth and erythema. It typically affects middle-aged male patients.</p>



Question 56 of 62

Next

Which of the following is least likely to be associated with ankylosing spondylitis?



- ☐ A. Apical fibrosis
- ☐ B. Achilles tendonitis
- ☐ C. Amyloidosis
- ☒ D. Achalasia
- ☐ E. Heart block

Next question

Ankylosing spondylitis features - the 'A's

- Apical fibrosis

- Anterior uveitis
- Aortic regurgitation
- Achilles tendonitis
- AV node block
- Amyloidosis

Achalasia is not a recognised association of ankylosing spondylitis

Ankylosing spondylitis: features

Ankylosing spondylitis is a HLA-B27 associated spondyloarthropathy. It typically presents in males (sex ratio 5:1) aged 20-30 years old.

Features

- typically a young man who presents with lower back pain and stiffness of insidious onset
- stiffness is usually worse in the morning and improves with exercise
- the patient may experience pain at night which improves on getting up

Clinical examination

- reduced lateral flexion
- reduced forward flexion - Schober's test - a line is drawn 10 cm above and 5 cm below the back dimples (dimples of Venus). The distance between the two lines should increase by more than 5 cm when the patient bends as far forward as possible
- reduced chest expansion

Other features - the 'A's

- Apical fibrosis
- Anterior uveitis
- Aortic regurgitation
- Achilles tendonitis
- AV node block
- Amyloidosis
- and cauda equina syndrome
- peripheral arthritis (25%, more common if female)



Question 57 of 62

Next

Which one of the following statements regarding adhesive capsulitis (frozen shoulder) is correct?



- | | |
|----------------------------------|---|
| <input type="radio"/> | A. It is bilateral in around 40% of cases |
| <input checked="" type="radio"/> | B. Each episode typically lasts between 6 months and 2 years |
| <input type="radio"/> | C. Abduction is most severely affected |
| <input type="radio"/> | D. It is most common in elderly patients (> 70 years of age) |
| <input type="radio"/> | E. Early physiotherapy has been shown to resolve 60% of cases within 6 months |

Next question

Adhesive capsulitis

Adhesive capsulitis (frozen shoulder) is a common cause of shoulder pain. It is most common in middle-aged females. The aetiology of frozen shoulder is not fully understood.

Associations

- diabetes mellitus: up to 20% of diabetics may have an episode of frozen shoulder

Features typically develop over days

- external rotation is affected more than internal rotation or abduction
- both active and passive movement are affected
- patients typically have a painful freezing phase, an adhesive phase and a recovery phase
- bilateral in up to 20% of patients
- the episode typically lasts between 6 months and 2 years

Management

- no single intervention has been shown to improve outcome in the long-term

- treatment options include NSAIDs, physiotherapy, oral corticosteroids and intra-articular corticosteroids

0 / 3

Question 58-60 of 62

Next

Theme: Hip pain in adults

A.	Inflammatory arthritis
B.	Trochanteric bursitis
C.	Pubic symphysis dysfunction
D.	Osteoarthritis
E.	Meralgia paraesthetica
F.	Avascular necrosis
G.	Transient idiopathic osteoporosis
H.	Referred lumbar spine pain
I.	Perthes' disease
J.	Slipped upper femoral epiphysis

For each one of the following scenarios please select the most likely diagnosis:

- 58.** A woman in her third trimester of pregnancy presents with severe pain in her right groin. She has a very limited range of movement and has difficulty weight bearing. Inflammatory markers are elevated

 You answered Inflammatory arthritis

The correct answer is Transient idiopathic osteoporosis

This is classic presentation of a rare condition, transient idiopathic osteoporosis. The severity, location and raised inflammatory markers point towards this diagnosis

- 59.** A 52-year-old man complains of numbness and pain over the anterior skin of the left thigh

 You answered Trochanteric bursitis

The correct answer is Meralgia paraesthetica

60. A 43-year-old woman complains of right hip pain. During the examination the patient lies on her left side and the right hip is extended with a straight leg. Flexing the knee then recreates the pain

 You answered Pubic symphysis dysfunction

The correct answer is Referred lumbar spine pain

This is a femoral nerve stretch test

[Next question](#)

Hip pain in adults

The table below provides a brief summary of the potential causes of hip pain in adults

Condition	Features
Osteoarthritis	Pain exacerbated by exercise and relieved by rest Reduction in internal rotation is often the first sign Age, obesity and previous joint problems are risk factors
Inflammatory arthritis	Pain in the morning Systemic features Raised inflammatory markers
Referred lumbar spine pain	Femoral nerve compression may cause referred pain in the hip Femoral nerve stretch test may be positive - lie the patient prone. Extend the hip joint with a straight leg then bend the knee. This stretches the femoral nerve and will cause pain if it is trapped
Greater trochanteric pain syndrome (Trochanteric bursitis)	Due to repeated movement of the fibroelastic iliotibial band Pain and tenderness over the lateral side of thigh Most common in women aged 50-70 years
Meralgia paraesthetica	Caused by compression of lateral cutaneous nerve of thigh Typically burning sensation over antero-lateral aspect of thigh
Avascular necrosis	Symptoms may be of gradual or sudden onset

Condition	Features
	May follow high dose steroid therapy or previous hip fracture or dislocation
Pubic symphysis dysfunction	Common in pregnancy Ligament laxity increases in response to hormonal changes of pregnancy Pain over the pubic symphysis with radiation to the groins and the medial aspects of the thighs. A waddling gait may be seen
Transient idiopathic osteoporosis	An uncommon condition sometimes seen in the third trimester of pregnancy Groin pain associated with a limited range of movement in the hip Patients may be unable to weight bear ESR may be elevated



Question 61 of 62

Next

A 75-year-old man presents with back pain that comes on when he walks. After taking a full history and completing a neurological and vascular examination which is normal a diagnosis of spinal stenosis is suspected. After prescribing analgesia, what is the most appropriate next step?



- ☐ A. Lumbar spine x-ray
- ☐ B. Arrange physiotherapy
- ☐ C. Refer for duplex scan
- ☒ D. Refer for MRI
- ☐ E. Perform a myeloma screen



Next question

This presentation requires a MRI to confirm the diagnosis and exclude other causes

Lower back pain

Lower back pain (LBP) is one of the most common presentations seen in practice. Whilst the majority of presentations will be of a non-specific muscular nature it is worth keeping in mind

possible causes which may need specific treatment.

Red flags for lower back pain

- age < 20 years or > 50 years
- history of previous malignancy
- night pain
- history of trauma
- systemically unwell e.g. weight loss, fever

The table below indicates some specific causes of LBP:

Facet joint	May be acute or chronic Pain worse in the morning and on standing On examination there may be pain over the facets. The pain is typically worse on extension of the back
Spinal stenosis	Usually gradual onset Unilateral or bilateral leg pain (with or without back pain), numbness, and weakness which is worse on walking. Resolves when sits down. Pain may be described as 'aching', 'crawling'. Relieved by sitting down, leaning forwards and crouching down Clinical examination is often normal Requires MRI to confirm diagnosis
Ankylosing spondylitis	Typically a young man who presents with lower back pain and stiffness Stiffness is usually worse in morning and improves with activity Peripheral arthritis (25%, more common if female)
Peripheral arterial disease	Pain on walking, relieved by rest Absent or weak foot pulses and other signs of limb ischaemia Past history may include smoking and other vascular diseases



Question 62 of 62

Which one of the following statements regarding trigger finger is true?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Steroid injection is an appropriate first-line treatment |
| <input type="radio"/> | B. It is most common in the index finger |
| <input type="radio"/> | C. It is associated with alcohol excess |

<input type="radio"/>	D. Men are more commonly affected
<input type="radio"/>	E. A history of repetitive use is found in most patients

Trigger finger

Trigger finger is a common condition associated with abnormal flexion of the digits. It is thought to be caused by a disparity between the size of the tendon and pulleys through which they pass. In simple terms the tendon becomes 'stuck' and cannot pass smoothly through the pulley.

Associations* (idiopathic in the majority)

- more common in women than men
- rheumatoid arthritis
- diabetes mellitus

Features

- more common in the thumb, middle, or ring finger
- initially stiffness and snapping ('trigger') when extending a flexed digit
- a nodule may be felt at the base of the affected finger

Management

- steroid injection is successful in the majority of patients. A finger splint may be applied afterwards
- surgery should be reserved for patients who have not responded to steroid injections

*there is scanty evidence to support a link with repetitive use

Question 1 of 110

Next

A 19-year-old male with a history of asthma presents to the surgery due to shortness of breath. On examination his peak expiratory flow is 270 l/min (usual 600 l/min). Pulse is 96 bpm and the respiratory rate is 24 / min. A pulse oximeter is not available. Examination of the chest reveals a bilateral expiratory wheeze but is otherwise unremarkable. What is the most appropriate management?

- ☐ A. Oxygen + nebulised salbutamol + prednisolone arrange immediate admission to A&E via ambulance
- ☐ B. Nebulised salbutamol + advise to double inhaled steroids + allow home if settles with follow-up review
- ☐ C. Oxygen + nebulised salbutamol + prednisolone arrange immediate admission to medical team via ambulance
- ☒ D. Oxygen + nebulised salbutamol + prednisolone and review 20 minutes later
- ☐ E. Nebulised salbutamol + allow home if settles with a script for prednisolone

Next question

Whilst his respiratory rate is consistent with a 'moderate' exacerbation his peak flow, less than 50% of usual, means he should be treated as for a 'severe' exacerbation. Patients with any feature of a severe attack persisting after initial treatment should be admitted. Nebulised ipratropium bromide should also be considered (if available) for patients with severe or life-threatening asthma.

The British Thoracic Society (BTS) give specific recommendations on dealing with acute asthma in primary care - please see the link.

If a pulse oximeter was available and the patient was not hypoxic then it may be appropriate to withhold oxygen as per BTS guidelines. Without this information however it is safer to presume that the patient is hypoxic.

Asthma: assessment and management in primary care

Patients with acute asthma are stratified into moderate, severe or life-threatening

Moderate	Severe	Life-threatening
◆ PEFr > 50% best or	◆ PEFr 33 - 50% best or	◆ PEFr < 33% best or predicted

Moderate	Severe	Life-threatening
<p>predicted</p> <ul style="list-style-type: none"> Speech normal RR < 25 / min Pulse < 110 bpm 	<p>predicted</p> <ul style="list-style-type: none"> Can't complete sentences RR > 25/min Pulse > 110 bpm 	<ul style="list-style-type: none"> Oxygen sats < 92% Silent chest, cyanosis or feeble respiratory effort Bradycardia, dysrhythmia or hypotension Exhaustion, confusion or coma

Management of moderate asthma

- beta 2 agonists such as salbutamol, either nebulised or via a spacer (4-6 puffs, given one at a time and inhaled separately, repeated at intervals of 10-20 minutes)
- if PEFR between 50-75% then prednisolone 40-50mg

Management of severe asthma

- consider admission
- oxygen to hypoxaemic patients to maintain a SpO2 of 94-98%
- beta 2 agonists such as salbutamol, either nebulised or via a spacer (4-6 puffs, given one at a time and inhaled separately, repeated at intervals of 10-20 minutes)
- prednisolone 40-50mg
- if no response then admit

Management of life-threatening asthma

- arrange immediate admission (999 call)
- oxygen to hypoxaemic patients to maintain a SpO2 of 94-98%
- nebulised beta 2 agonists (e.g. Salbutamol) + ipratropium
- prednisolone 40-50mg or IV hydrocortisone 100mg

Question 2 of 110

Next

A 67-year-old man presents with progressive exertional dyspnoea. These symptoms have been getting progressively worse over the past nine months and are associated with a dry cough. He gave up smoking 20 cigarettes/day around 30 years ago. On examination his oxygen saturations are 97%

on room air, respiratory rate is 14/min and there are some fine bibasal crackles. Finger clubbing is noted. Investigations show the following:

B-type natriuretic peptide 88 pg/ml (< 100pg/ml)

ECG: sinus rhythm, 72/min

Spirometry

FEV1	1.57 L (50% of predicted)
FVC	1.63 L (39% of predicted)
FEV1/FVC	96%

What is the most likely diagnosis?

- ☐ A. Primary pulmonary hypertension
- ☐ B. Heart failure
- ☐ C. Chronic obstructive pulmonary disease
- ☒ D. Idiopathic pulmonary fibrosis
- ☐ E. Lung cancer

Next question

This is a typical history of idiopathic pulmonary fibrosis: a male patient aged 50-70 years presenting with progressive exertional dyspnoea associated with clubbing and a restrictive picture on spirometry,

The normal B-type natriuretic peptide makes heart failure extremely unlikely.

Idiopathic pulmonary fibrosis

Idiopathic pulmonary fibrosis (IPF, previously termed cryptogenic fibrosing alveolitis) is a chronic lung condition characterised by progressive fibrosis of the interstitium of the lungs. Whilst there are many causes of lung fibrosis (e.g. medications, connective tissue disease, asbestos) the term IPF is reserved when no underlying cause exists.

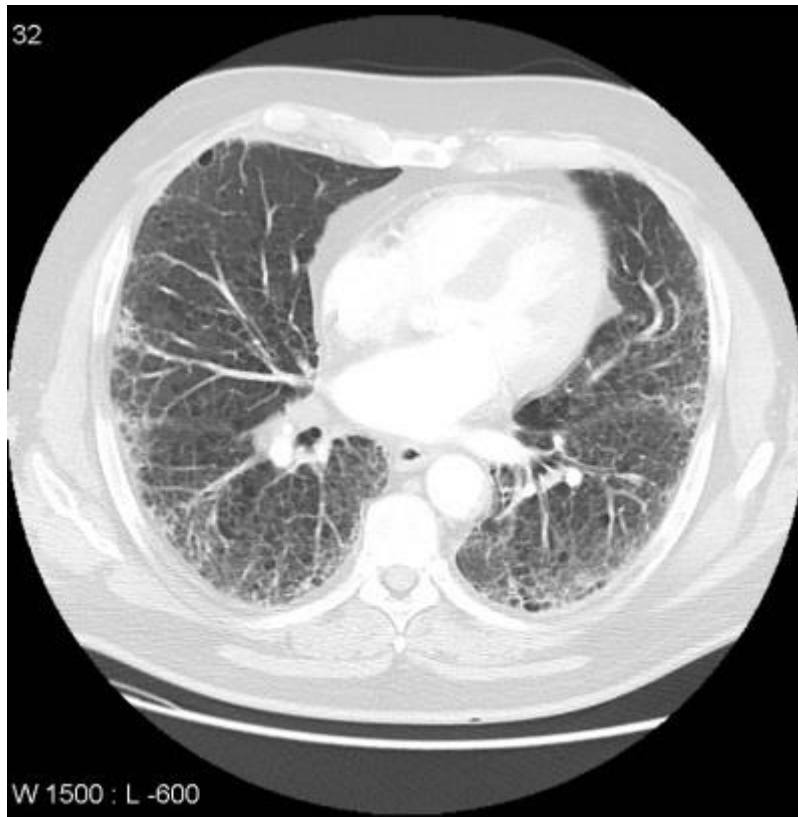
IPF is typically seen in patients aged 50-70 years and is twice as common in men.

Features

- progressive exertional dyspnoea
- bibasal crackles on auscultation
- dry cough
- clubbing

Diagnosis

- spirometry: classically a restrictive picture (FEV1 normal/decreased, FVC decreased, FEV1/FVC increased)
- impaired gas exchange: reduced transfer factor (TLCO)
- imaging: bilateral interstitial shadowing (typically small, irregular, peripheral opacities - 'ground-glass' - later progressing to 'honeycombing') may be seen on a chest x-ray but high-resolution CT scanning is the investigation of choice and required to make a diagnosis of IPF
- ANA positive in 30%, rheumatoid factor positive in 10% but this does not necessarily mean that the fibrosis is secondary to a connective tissue disease. Titres are usually low





CT scan showing advanced pulmonary fibrosis including 'honeycombing'

Management

- pulmonary rehabilitation
- very few medications have been shown to give any benefit in IPF. There is some evidence that pirfenidone (an antifibrotic agent) may be useful in selected patients (see NICE guidelines)
- many patients will require supplementary oxygen and eventually a lung transplant

Prognosis

- poor, average life expectancy is around 3-4 years

Question 3 of 110

Next

A 24-year-old female presents with episodic wheezing and shortness of breath for the past 4 months. She has smoked for the past 8 years and has a history of eczema. Examination of her chest is unremarkable. Spirometry is arranged and is reported as normal. What is the most appropriate management of her symptoms?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Peak flow diary |
| <input type="radio"/> | B. Trial of lansoprazole |
| <input type="radio"/> | C. Baseline FEV1 repeated following inhaled corticosteroids |
| <input type="radio"/> | D. Arrange a chest x-ray |
| <input checked="" type="radio"/> | E. Trial of salbutamol inhaler |

Next question

Asthma diagnosis - if high probability of asthma - start treatment

The new British Thoracic Society guidelines take a more practical approach to diagnosing asthma. If a patient has typical symptoms of asthma a trial of treatment is recommended. Normal spirometry when the patient is well does not exclude a diagnosis of asthma. The smoking history is unlikely to be relevant at her age.

What is not necessarily clear is whether all patients should have spirometry prior to starting treatment - how do you interpret the guidelines?

Asthma: diagnosis in adults

Whilst the diagnosis of asthma remains largely clinical, the British Thoracic Society (BTS) guidelines do offer some guidance on how we should approach this problem, for both adults and children. They recommend we classify patients as having either a high, intermediate or low probability of asthma based on the presence or absence of certain symptoms:

For adults it is recommended that they have a **clinical assessment including spirometry** (or Peak Expiratory Flow measurement if spirometry is not available):

When assessing patients we should therefore look for symptoms which may support a diagnosis of asthma, and those which may point to an alternative diagnosis. The BTS produced a list of features which are helpful when deciding this:

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:</p> <ul style="list-style-type: none">• symptoms worse at night and in the early morning• symptoms in response to exercise, allergen exposure and cold air• symptoms after taking aspirin or beta blockers <p>History of atopic disorder</p> <p>Family history of asthma and/or atopic disorder</p> <p>Widespread wheeze heard on auscultation of the chest</p> <p>Otherwise unexplained low FEV1 or PEF (historical or serial readings)</p>	<p>Prominent dizziness, light-headedness, peripheral tingling</p> <p>Chronic productive cough in the absence of wheeze or breathlessness</p> <p>Repeatedly normal physical examination of chest when symptomatic</p> <p>Voice disturbance</p> <p>Symptoms with colds only</p> <p>Significant smoking history (ie > 20 pack-years)</p>

Otherwise unexplained peripheral blood eosinophilia	Cardiac disease Normal PEF or spirometry when symptomatic
---	--

If a patient has many symptoms which make a diagnosis of asthma more likely (i.e. a **high probability**) then the BTS recommend that we start a trial of treatment. A good response is considered a positive 'test of reversibility'. If a patient has a poor response to treatment then further investigations should be considered.

What is the most appropriate initial treatment?

The BTS state the following:

Patients should start treatment at the step most appropriate to the initial severity of their asthma

This means that for some patients prescribing a corticosteroid inhaler in addition to a salbutamol inhaler is appropriate. The BTS suggest the following patients would benefit from a corticosteroid inhaler:

Inhaled steroids should be considered for patients with any of the following asthma-related features:

- *exacerbations of asthma in the last two years*
- *using inhaled β_2 agonists three times a week or more*
- *symptomatic three times a week or more*
- *waking one night a week*

The last two points are probably the most relevant to newly diagnosed patients.

For patients with a **low probability** of asthma then an alternative diagnosis should be sought. Further investigations and referral to a respiratory specialist should be considered.

If a patient has an **intermediate probability** of asthma the BTS recommend 'to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a diagnosis and establishing maintenance treatment. '. The accompanying algorithm suggests this decision should be partly guided by the FEV₁/FVC ratio - a ratio of < 0.7 is suggestive of asthma.

It should of course be noted that spirometry may be normal in asymptomatic patients so it may be necessary to repeat spirometry or peak flow readings on a number of occasions in patients where the diagnosis is not clear.

Recent studies have shown the limited value of other 'objective' tests. It is now recognised that in patients with normal or near-normal pre-treatment lung function there is little room for measurable improvement in FEV1 or peak flow.

A > 400 ml improvement in FEV1 is considered significant

- before and after 400 mcg inhaled salbutamol in patients with diagnostic uncertainty and airflow obstruction present at the time of assessment
- if there is an incomplete response to inhaled salbutamol, after either inhaled corticosteroids (200 mcg twice daily beclometasone equivalent for 6-8 weeks) or oral prednisolone (30 mg once daily for 14 days)

It is now advised to interpret peak flow variability with caution due to the poor sensitivity of the test

- diurnal variation % = $[(\text{Highest} - \text{Lowest PEFr}) / \text{Highest PEFr}] \times 100$
- assessment should be made over 2 weeks
- greater than 20% diurnal variation is considered significant

Question 4-6 of 110

Next

Theme: Shortness of breath

- | | |
|----|---------------------------------------|
| A. | Heart failure |
| B. | Recurrent pulmonary emboli |
| C. | Lung cancer |
| D. | Obesity |
| E. | Pulmonary fibrosis |
| F. | Anaemia |
| G. | Asthma |
| H. | Chronic obstructive pulmonary disease |
| I. | Bronchiectasis |

J. Aortic stenosis

For each one of the following scenarios please select the most likely diagnosis:

4. A 54-year-old obese woman presents with shortness of breath. She currently uses HRT and smokes 20 per day. Chest auscultation is unremarkable. Spirometry shows an obstructive pattern with no reversibility to bronchodilators.

The correct answer is Chronic obstructive pulmonary disease

The lack of reversibility in response to bronchodilator therapy suggests a diagnosis of COPD rather than asthma.

5. A 62-year-old man who is currently being treated for colorectal cancer presents with progressive shortness of breath over the past 2 months. Respiratory examination is unremarkable other than a respiratory rate of 24 / min. He is also noted to have a raised JVP and a pulse rate of 96 / min.

The correct answer is Recurrent pulmonary emboli

6. A 67-year-old man presents with increasing shortness of breath. His symptoms are worse at night. A third heart sound is noted on examination.

✓ Heart failure

[Next question](#)

Shortness of breath: chronic

The table below gives characteristic features for conditions causing chronic shortness of breath (SOB):

Chronic obstructive pulmonary disease	Seen invariably in smokers Chronic productive cough is typical
--	---

	Features of right heart failure may be seen
Heart failure	<p>A history of ischaemic heart disease or hypertension may be present</p> <p>Orthopnoea and paroxysmal nocturnal dyspnoea are characteristic</p> <p>Bibasal crackles and a third heart sound (S3) are the most reliable features of left-sided failure</p> <p>Right heart failure causes peripheral oedema and a raised JVP</p>
Asthma	<p>Cough, wheeze and shortness of breath are typical</p> <p>Symptoms are often worse at night and may be precipitated by cold weather or exercise</p> <p>Associated with hay fever and eczema</p>
Aortic stenosis	<p>Chest pain, SOB and syncope seen in symptomatic patients</p> <p>An ejection systolic murmur radiating to the neck and narrow pulse pressure are found on examination</p>
Recurrent pulmonary emboli	<p>There may be a history of predisposing factors e.g. Malignancy</p> <p>Pleuritic chest pain and haemoptysis may be seen but symptoms are often vague</p> <p>Tachycardia and tachypnoea are common in the acute situation</p> <p>Symptoms of right heart failure may develop in severe cases</p>
Lung cancer	<p>Normally seen in smokers</p> <p>Haemoptysis, chronic cough or unresolving infection are common presentations</p> <p>Systemic symptoms e.g. Weight loss and anorexia</p>
Pulmonary fibrosis	<p>Progressive shortness of breath may be the only symptom</p> <p>Fine bibasal crackles are typical</p> <p>Spirometry shows a restrictive pattern</p>
Bronchiectasis	<p>Affected patients may produce large amounts of purulent sputum</p> <p>Patients may have a history of previous infections (e.g. Tuberculosis, measles), bronchial obstruction or ciliary dysketic syndromes e.g. Kartagener's syndrome</p>
Anaemia	<p>There may be a history of gastrointestinal symptoms</p> <p>Pallor may be seen on examination</p>
Obesity	<p>Obese patients tend to be more SOB due to the increased work of activity</p>

Question 7 of 110

Next

A 29-year-old woman who is 14 weeks pregnant presents to the Emergency Department with an exacerbation of asthma. She quickly settles with nebulised salbutamol and you are asked to review her prior to discharge. She currently only uses a salbutamol inhaler (100mcg) as required and thinks that the most common trigger is grass pollen. Her peak flow is now 380 l/min (predicted 440 l/min) and inhaler technique is good. What is the most appropriate course of action?

- ☐ A. Add inhaled ipratropium bromide 500mcg qds
- ☐ B. Suggest she uses the salbutamol 100mcg qds
- ☐ C. Arrange a course of pollen desensitisation injections
- ☐ D. Add inhaled salmeterol 50mcg bd
- ☒ E. Add inhaled beclomethasone 200mcg bd

Next question

The British Thoracic Society (BTS) guidelines make it clear that short-acting /long-acting beta 2-agonists, inhaled and oral corticosteroids should all be used as normal during pregnancy.

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
Step 1	Inhaled short-acting B2 agonist as required
Step 2	Add inhaled steroid at 200-800 mcg/day* 400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease
Step 3	1. Add inhaled long-acting B2 agonist (LABA) 2. Assess control of asthma:

	<ul style="list-style-type: none"> • good response to LABA - continue LABA • benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose) • no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/ day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
Step 4	<p>Consider trials of:</p> <ul style="list-style-type: none"> • increasing inhaled steroid up to 2000 mcg/day* • addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet • the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
Step 5	<p>Use daily steroid tablet in lowest dose providing adequate control. Consider other treatments to minimise the use of steroid tablets</p> <p>Maintain high dose inhaled steroid at 2000 mcg/day*</p> <p>Refer patient for specialist care</p>

*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
- have both anti-inflammatory and bronchodilatory properties
- should be used when patients are poorly controlled on high-dose inhaled corticosteroids and a long-acting b2-agonist
- particularly useful in aspirin-induced asthma
- associated with the development of Churg-Strauss syndrome

Fluticasone is more lipophilic and has a longer duration of action than beclometasone

Hydrofluoroalkane is now replacing chlorofluorocarbon as the propellant of choice. Only half the usually dose is needed with hydrofluoroalkane due to the smaller size of the particles

Long acting B2-agonists acts as bronchodilators but also inhibit mediator release from mast cells. Recent meta-analysis showed adding salmeterol improved symptoms compared to doubling the inhaled steroid dose

Question 8 of 110

Next

A 62-year-old woman with recently diagnosed chronic obstructive pulmonary disease (COPD) presents for review. Her FEV1 is 65% of the predicted value. She has managed to give up smoking and was prescribed a salbutamol inhaler to use as required. Despite this she is still symptomatic and complains of wheeze and shortness of breath. What is the most appropriate next step?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Add an inhaled corticosteroid |
| <input checked="" type="radio"/> | B. Add a long-acting muscarinic antagonist inhaler |
| <input type="radio"/> | C. Refer for consideration of long-term oxygen therapy |
| <input type="radio"/> | D. Add oral theophylline |
| <input type="radio"/> | E. Add a combination long-acting beta2-agonist and corticosteroid inhaler |

Next question

Following the 2010 NICE guidelines a long-acting beta2-agonist (LABA) would be an alternative option.

COPD: stable management

NICE updated it's guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination

- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 9-11 of 110

Next

Theme: Respiratory pathogens

- A. Adenovirus
- B. Parainfluenza virus
- C. *Haemophilus influenzae*
- D. Pneumocystis jiroveci
- E. Respiratory syncytial virus
- F. *Mycoplasma pneumoniae*
- G. Rhinovirus
- H. *Legionella pneumophila*
- I. *Streptococcus pneumoniae*
- J. Influenza virus

For each of the following scenarios please select the most likely causative respiratory pathogen:

9. Common cold

✓ Rhinovirus

10. A 45-year-old smoker who develops pneumonia

✓ *Streptococcus pneumoniae*

11. A 6-month-old who is 'chesty', has rhinitis and is off her feeds. Auscultation of her chest reveals bibasal crackles and an expiratory wheeze.

✓ Respiratory syncytial virus

[Next question](#)

Respiratory pathogens

The table below lists the more common respiratory pathogens:

Pathogen	Associated condition
Respiratory syncytial virus	Bronchiolitis
Parainfluenza virus	Croup
Rhinovirus	Common cold
Influenza virus	Flu
<i>Streptococcus pneumoniae</i>	The most common cause of community-acquired pneumonia
<i>Haemophilus influenzae</i>	Community-acquired pneumonia Most common cause of bronchiectasis exacerbations Acute epiglottitis
<i>Staphylococcus aureus</i>	Pneumonia, particularly following influenza

<i>Mycoplasma pneumoniae</i>	Atypical pneumonia Flu-like symptoms classically precede a dry cough. Complications include haemolytic anaemia and erythema multiforme
<i>Legionella pneumophila</i>	Atypical pneumonia Classically spread by air-conditioning systems, causes dry cough. Lymphopenia, deranged liver function tests and hyponatraemia may be seen
Pneumocystis jiroveci	Common cause of pneumonia in HIV patients. Typically patients have few chest signs and develop exertional dyspnoea
<i>Mycobacterium tuberculosis</i>	Causes tuberculosis. A wide range of presentations from asymptomatic to disseminated disease are possible. Cough, night sweats and weight loss may be seen

Question 12 of 110

Next

You are asked to interpret the post-bronchodilator spirometry results of a 56-year-old woman who has been complaining of progressive shortness-of-breath.

FEV1/FVC	0.60
FEV1% predicted	60%

What is the most appropriate interpretation of these results?

- ☐ A. Poor technique - repeat spirometry
- ☐ B. Asthma
- ☐ C. COPD (stage 1 - mild)
- ☒ D. COPD (stage 2 - moderate)
- ☐ E. Pulmonary fibrosis

Next question

COPD: investigation and diagnosis

NICE recommend considering a diagnosis of COPD in patients over 35 years of age who are smokers or ex-smokers and have symptoms such as exertional breathlessness, chronic cough or regular sputum production.

The following investigations are recommended in patients with suspected COPD:

- post-bronchodilator spirometry to demonstrate airflow obstruction: FEV1/FVC ratio less than 70%
- chest x-ray: hyperinflation, bullae, flat hemidiaphragm. Also important to exclude lung cancer
- full blood count: exclude secondary polycythaemia
- body mass index (BMI) calculation

The severity of COPD is categorised using the FEV1*:

Post-bronchodilator FEV1/FVC	FEV1 (of predicted)	Severity
< 0.7	> 80%	Stage 1 - Mild**
< 0.7	50-79%	Stage 2 - Moderate
< 0.7	30-49%	Stage 3 - Severe
< 0.7	< 30%	Stage 4 - Very severe

Measuring peak expiratory flow is of limited value in COPD, as it may underestimate the degree of airflow obstruction.

*note that the grading system has changed following the 2010 NICE guidelines. If the FEV1 is greater than 80% predicted but the post-bronchodilator FEV1/FVC is < 0.7 then this is classified as Stage 1 - mild

**symptoms should be present to diagnose COPD in these patients

Question 13 of 110

Next

The parents of a 3-year-old boy with cystic fibrosis ask for advice. They are considering having more children. What is the chance that their next child will be a carrier of the cystic fibrosis gene?

- ✓ ☒ A. 50%
- ☐ B. 100%
- ☐ C. 1 in 25
- ☐ D. 25%
- ☐ E. 66.6%

Next question

As cystic fibrosis is an autosomal recessive condition there is a 50% chance that their next child will be a **carrier** of cystic fibrosis (i.e. be heterozygous for the genetic defect) and a 25% chance that the child will actually have the disease (be homozygous).

Cystic fibrosis

Cystic fibrosis (CF) is an autosomal recessive disorder causing increased viscosity of secretions (e.g. lungs and pancreas). It is due to a defect in the cystic fibrosis transmembrane conductance regulator gene (CFTR), which codes a cAMP-regulated chloride channel

In the UK 80% of CF cases are due to delta F508 on the long arm of chromosome 7. Cystic fibrosis affects 1 per 2500 births, and the carrier rate is c. 1 in 25

Organisms which may colonise CF patients

- *Staphylococcus aureus*
- *Pseudomonas aeruginosa*
- *Burkholderia cepacia**
- *Aspergillus*

*previously known as *Pseudomonas cepacia*

Question 14 of 110

Next

A 62-year-old heavy smoker presents with shortness of breath and a morning cough. A chest x-ray shows hyperinflated lung fields. Spirometry is organized. Which one of the following set of results would be most consistent with a diagnosis of chronic obstructive pulmonary disease?

- ☐ A. FEV1 - reduced, FEV1/FVC - normal
- ☐ B. FEV1 - increased, FEV1/FVC - reduced
- ☒ C. FEV1 - reduced, FEV1/FVC - reduced
- ☐ D. FEV1 - normal, FEV1/FVC - reduced
- ☐ E. FEV1 - reduced, FEV1/FVC - increased

Next question

Pulmonary function tests

Pulmonary function tests can be used to determine whether a respiratory disease is obstructive or restrictive. The table below summarises the main findings and gives some example conditions:

Obstructive lung disease	Restrictive lung disease
FEV1 - significantly reduced FVC - reduced or normal FEV1% (FEV1/FVC) - reduced	FEV1 - reduced FVC - significantly reduced FEV1% (FEV1/FVC) - normal or increased
Asthma COPD Bronchiectasis Bronchiolitis obliterans	Pulmonary fibrosis Asbestosis Sarcoidosis Acute respiratory distress syndrome Infant respiratory distress syndrome Kyphoscoliosis Neuromuscular disorders

Question 15 of 110

Next

A 19-year-old who is normally fit and well presents with a sore throat. A decision is made not to prescribe antibiotics. How long should he be advised that his illness will last on average?

- ☐ A. 2 days
- ☐ B. 4 days
-  ☒ C. 1 week
- ☐ D. 10 days
- ☐ E. 2 weeks

Next question

Respiratory tract infections: NICE guidelines

NICE issued guidance in 2008 on the management of respiratory tract infection, focusing on the prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

A no antibiotic prescribing or delayed antibiotic prescribing approach is generally recommended for patients with acute otitis media, acute sore throat/acute pharyngitis/acute tonsillitis, common cold, acute rhinosinusitis or acute cough/acute bronchitis.

However, an immediate antibiotic prescribing approach may be considered for:

- children younger than 2 years with bilateral acute otitis media
- children with otorrhoea who have acute otitis media
- patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present

The Centor criteria* are as follows:

- presence of tonsillar exudate
- tender anterior cervical lymphadenopathy or lymphadenitis

- history of fever
- absence of cough

If the patient is deemed at risk of developing complications, an immediate antibiotic prescribing policy is recommended

- are systemically very unwell
- have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications)
- are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely
- are older than 65 years with acute cough and two or more of the following, or older than 80 years with acute cough and one or more of the following:
 - - hospitalisation in previous year
 - - type 1 or type 2 diabetes
 - - history of congestive heart failure
 - - current use of oral glucocorticoids

The guidelines also suggest that patients should be advised how long respiratory tract infections may last:

- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1 1/2 weeks
- acute rhinosinusitis: 2 1/2 weeks
- acute cough/acute bronchitis: 3 weeks

*if 3 or more of the criteria are present there is a 40-60% chance the sore throat is caused by Group A beta-haemolytic *Streptococcus*

Question 16 of 110

Next

A 42-year-old woman presents with pyrexia and a productive cough. Around 10 days ago she developed symptoms consistent with a flu-like illness. For around 4-5 days she was in bed with myalgia, fever and lethargy. Initially there was an improvement in her condition but over the past three days she has developed a cough productive of thick pink-yellow sputum. On examination there are scattered crackles in the right base. Her symptoms are not severe enough to warrant admission and oral amoxicillin is prescribed. Which other medication should also be given?

- ☐ A. Aciclovir
- ☐ B. Ciprofloxacin
- ☐ C. Oseltamivir
- ☒ D. Flucloxacillin
- ☐ E. Penicillin V

Next question

There is a high incidence of *Staphylococcus aureus* pneumonia in patients following influenza. As a result the BNF advises the co-prescription of flucloxacillin in such a situation.

Pneumonia: community-acquired

Community acquired pneumonia (CAP) may be caused by the following infectious agents:

- *Streptococcus pneumoniae* (accounts for around 80% of cases)
- *Haemophilus influenzae*
- *Staphylococcus aureus*: commonly after the 'flu
- atypical pneumonias (e.g. Due to *Mycoplasma pneumoniae*)
- viruses

Klebsiella pneumoniae is classically in alcoholics

***Streptococcus pneumoniae* (pneumococcus)** is the most common cause of community-acquired pneumonia

Characteristic features of pneumococcal pneumonia

- rapid onset
- high fever
- pleuritic chest pain
- herpes labialis

Management

CURB-65 criteria of severe pneumonia

- Confusion (abbreviated mental test score $\leq 8/10$)
- Urea > 7 mmol/L
- Respiratory rate ≥ 30 / min
- BP: systolic ≤ 90 or diastolic ≤ 60 mmHg
- age ≥ 65 years

Patients with 3 or more (out of 5) of the above criteria are regarded as having a severe pneumonia


The British Thoracic Society published guidelines in 2009:

- low or moderate severity CAP: oral amoxicillin. A macrolide should be added for patients admitted to hospital
- high severity CAP: intravenous co-amoxiclav + clarithromycin OR cefuroxime + clarithromycin OR cefotaxime + clarithromycin
- the current BNF has slightly different recommendations for high severity CAP: intravenous benzylpenicillin + clarithromycin OR benzylpenicillin + doxycycline. For 'life-threatening' infections the BNF recommends the same as the BTS guidelines for high-severity CAP

Question 17 of 110

Next

A 24-year-old female comes for review. She was diagnosed with asthma two years ago and is currently using a salbutamol inhaler 100mcg prn combined with beclometasone dipropionate inhaler 200mcg bd. Despite this her asthma is not well controlled. On examination her chest is clear and she has a good inhaler technique. What is the most appropriate next step in management?

- ☐ A. Increase beclometasone dipropionate to 400mcg bd
- ☐ B. Switch steroid to fluticasone propionate
- ☐ C. Trial of leukotriene receptor antagonist
-  ☒ D. Add salmeterol
- ☐ E. Add tiotropium

Next question

The British Thoracic Society recommend adding a long-acting B2 agonist if there is an inadequate response to the addition of inhaled steroid. The inhaled steroid dose should be increased if there is an inadequate response to the long-acting B2 agonist.

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
Step 1	Inhaled short-acting B2 agonist as required
Step 2	Add inhaled steroid at 200-800 mcg/day* 400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease
Step 3	1. Add inhaled long-acting B2 agonist (LABA) 2. Assess control of asthma: <ul style="list-style-type: none"> • good response to LABA - continue LABA • benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose) • no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/ day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
Step	Consider trials of:

Step	Management
4	<ul style="list-style-type: none"> increasing inhaled steroid up to 2000 mcg/day* addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
Step 5	<p>Use daily steroid tablet in lowest dose providing adequate control. Consider other treatments to minimise the use of steroid tablets</p> <p>Maintain high dose inhaled steroid at 2000 mcg/day*</p> <p>Refer patient for specialist care</p>

*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
- have both anti-inflammatory and bronchodilatory properties
- should be used when patients are poorly controlled on high-dose inhaled corticosteroids and a long-acting b2-agonist
- particularly useful in aspirin-induced asthma
- associated with the development of Churg-Strauss syndrome

Fluticasone is more lipophilic and has a longer duration of action than beclometasone

Hydrofluoroalkane is now replacing chlorofluorocarbon as the propellant of choice. Only half the usually dose is needed with hydrofluoroalkane due to the smaller size of the particles

Long acting B2-agonists acts as bronchodilators but also inhibit mediator release from mast cells. Recent meta-analysis showed adding salmeterol improved symptoms compared to doubling the inhaled steroid dose

Question 18 of 110

Next

A 24-year-old female with a history of asthma presents to the surgery complaining of being 'tight-chested'. On examination breath sounds are quiet bilaterally and oxygen saturations are 91%. The pulse is 90 bpm and her respiratory rate is 18 / min. She doesn't want to do a peak flow as she says it makes her feel more short of breath. What is the most appropriate management?

- ☐ A. Nebulised salbutamol + prednisolone + allow home if settles with follow-up review
- ☐ B. Oxygen + nebulised salbutamol + advise to double inhaled steroids + allow home if settles with follow-up review
- ☐ C. Nebulised salbutamol + advise to double inhaled steroids + allow home if settles with follow-up review
- ☐ D. Oxygen + nebulised salbutamol + allow home if settles with follow-up review
- ☒ E. Oxygen + nebulised salbutamol + prednisolone arrange immediate admission to A&E via ambulance

Next question

A quiet chest and hypoxia are signs of life-threatening asthma. The British Thoracic Society give specific recommendations on dealing with acute asthma in primary care - please see the link

Remember that the pulse and respiratory may actually drop in life-threatening asthma

Asthma: assessment and management in primary care

Patients with acute asthma are stratified into moderate, severe or life-threatening

Moderate	Severe	Life-threatening
<ul style="list-style-type: none">PEFR > 50% best or predictedSpeech normalRR < 25 / minPulse < 110 bpm	<ul style="list-style-type: none">PEFR 33 - 50% best or predictedCan't complete sentencesRR > 25/minPulse > 110 bpm	<ul style="list-style-type: none">PEFR < 33% best or predictedOxygen sats < 92%Silent chest, cyanosis or feeble respiratory effortBradycardia, dysrhythmia or hypotensionExhaustion, confusion or coma

Management of moderate asthma

- beta 2 agonists such as salbutamol, either nebulised or via a spacer (4-6 puffs, given one at a time and inhaled separately, repeated at intervals of 10-20 minutes)
- if PEFR between 50-75% then prednisolone 40-50mg

Management of severe asthma

- consider admission
- oxygen to hypoxaemic patients to maintain a SpO₂ of 94-98%
- beta 2 agonists such as salbutamol, either nebulised or via a spacer (4-6 puffs, given one at a time and inhaled separately, repeated at intervals of 10-20 minutes)
- prednisolone 40-50mg
- if no response then admit

Management of life-threatening asthma

- arrange immediate admission (999 call)
- oxygen to hypoxaemic patients to maintain a SpO₂ of 94-98%
- nebulised beta 2 agonists (e.g. Salbutamol) + ipratropium
- prednisolone 40-50mg or IV hydrocortisone 100mg

Question 19 of 110

Next

You are reviewing a 25-year-old woman who has presented with chest pain and shortness-of-breath.

When examining her, which one of the following clinical signs is most commonly found in patients with a pulmonary embolism?

- | | |
|----------------------------------|----------------------|
| <input type="radio"/> | A. Focal wheeze |
| <input checked="" type="radio"/> | B. Tachypnoea |
| <input type="radio"/> | C. Tachycardia |
| <input type="radio"/> | D. Pleural rub |
| <input type="radio"/> | E. Third heart sound |

Tachypnoea is the most common sign found in patients with pulmonary embolism

The relative frequency of common clinical signs is shown below:

- Tachypnea (respiratory rate >16/min) - 96%
- Crackles - 58%
- Tachycardia (heart rate >100/min) - 44%
- Fever (temperature >37.8°C) - 43%

It is interesting to note that the Well's criteria for diagnosing a PE use tachycardia rather than tachypnoea.

Clinical Characteristics of Patients with Acute Pulmonary Embolism(Data from PIOPED II) Am J Med. Oct 2007; 120(10): 871-879.

Pulmonary embolism: investigation

We know from experience that few patients (around 10%) present with the medical student textbook triad of pleuritic chest pain, dyspnoea and haemoptysis. Pulmonary embolism can be difficult to diagnose as it can present with virtually any cardiorespiratory symptom/sign depending on its location and size.

So which features make pulmonary embolism *more* likely?

The PIOPED study¹ in 2007 looked at the frequency of different symptoms and signs in patients who were diagnosed with pulmonary embolism.

The relative frequency of common clinical signs is shown below:

- Tachypnea (respiratory rate >16/min) - 96%
- Crackles - 58%
- Tachycardia (heart rate >100/min) - 44%
- Fever (temperature >37.8°C) - 43%

It is interesting to note that the Well's criteria for diagnosing a PE use tachycardia rather than tachypnoea.

2012 NICE guidelines

All patients with symptoms or signs suggestive of a PE should have a history taken, examination performed and a chest x-ray to exclude other pathology.

If a PE is still suspected a two-level PE Wells score should be performed:

Clinical feature	Points
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3
An alternative diagnosis is less likely than PE	3
Heart rate > 100 beats per minute	1.5
Immobilisation for more than 3 days or surgery in the previous 4 weeks	1.5
Previous DVT/PE	1.5
Haemoptysis	1
Malignancy (on treatment, treated in the last 6 months, or palliative)	1

Clinical probability simplified scores

- PE likely - more than 4 points
- PE unlikely - 4 points or less

If a PE is 'likely' (more than 4 points) arrange an immediate computed tomography pulmonary angiogram (CTPA). If there is a delay in getting the CTPA then give low-molecular weight heparin until the scan is performed.

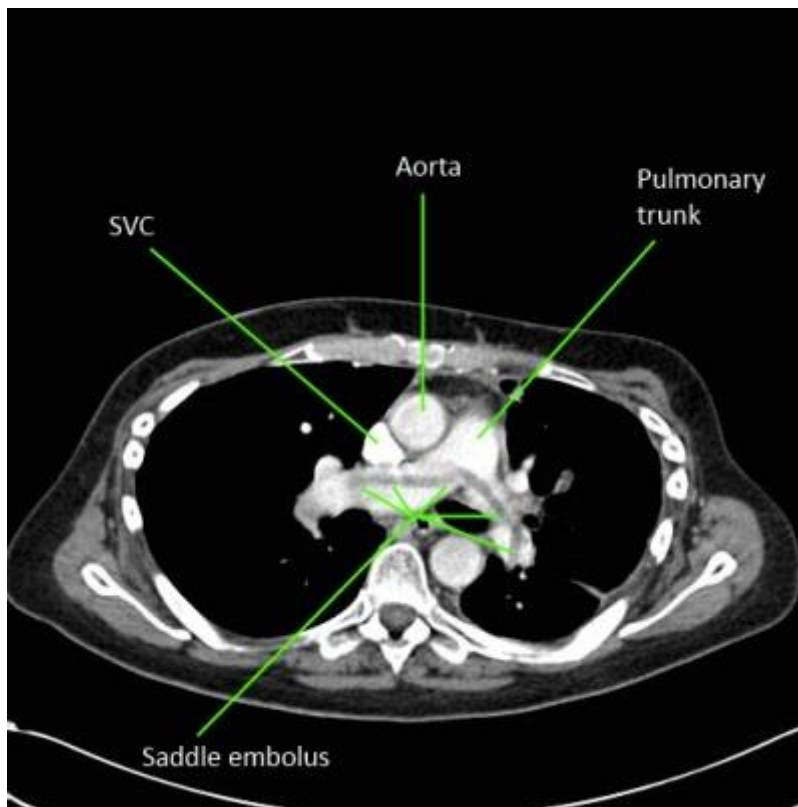
If a PE is 'unlikely' (4 points or less) arranged a D-dimer test. If this is positive arrange an immediate computed tomography pulmonary angiogram (CTPA). If there is a delay in getting the CTPA then give low-molecular weight heparin until the scan is performed.

If the patient has an allergy to contrast media or renal impairment a V/Q scan should be used instead of a CTPA.

CTPA or V/Q scan?

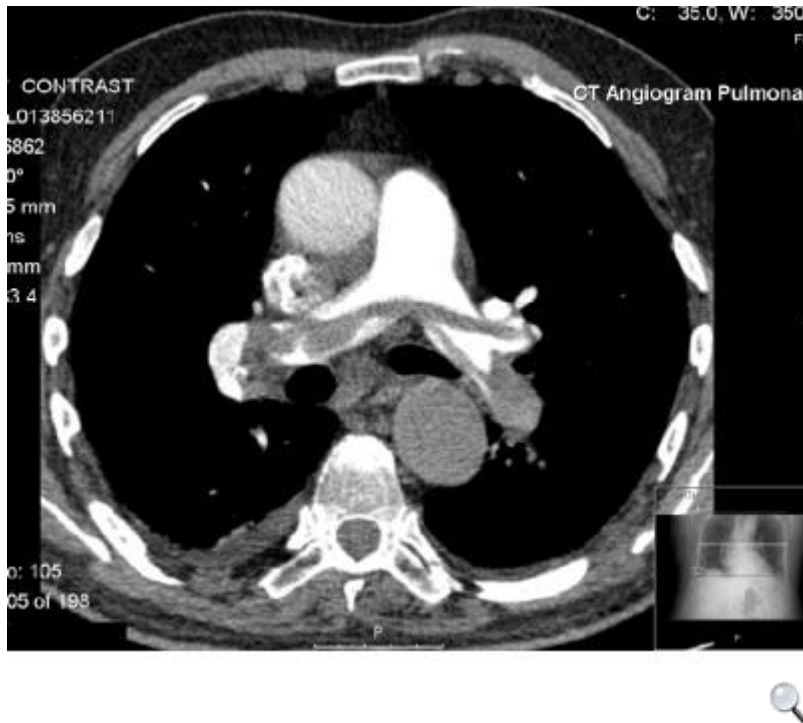
The consensus view from the British Thoracic Society and NICE guidelines is as follows:

- computed tomographic pulmonary angiography (CTPA) is now the recommended initial lung-imaging modality for non-massive PE. Advantages compared to V/Q scans include speed, easier to perform out-of-hours, a reduced need for further imaging and the possibility of providing an alternative diagnosis if PE is excluded
- if the CTPA is negative then patients do not need further investigations or treatment for PE
- ventilation-perfusion scanning may be used initially if appropriate facilities exist, the chest x-ray is normal, and there is no significant symptomatic concurrent cardiopulmonary disease



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Labelled CTPA showing a large saddle embolus



Further CTPA again showing a saddle embolus

Some other points

D-dimers

- sensitivity = 95-98%, but poor specificity

ECG

- the classic ECG changes seen in PE are a large S wave in lead I, a large Q wave in lead III and an inverted T wave in lead III - 'S1Q3T3'. However this change is seen in no more than 20% of patients
- right bundle branch block and right axis deviation are also associated with PE
- sinus tachycardia may also be seen



© Image used on license from [Dr Smith, University of Minnesota](#)



ECG from a patient with a PE. Shows a sinus tachycardia and a partial S1Q3T3 - the S wave is not particularly convincing.



© Image used on license from [Dr Smith, University of Minnesota](#)



ECG of a patient with a PE. It shows some of the ECG features that may be associated with PE (sinus tachycardia, S1, T3 and T wave inversion in the precordial leads). Other features such as the left axis deviation are atypical.

V/Q scan

- sensitivity = 98%; specificity = 40% - high negative predictive value, i.e. if normal virtually excludes PE
- other causes of mismatch in V/Q include old pulmonary embolisms, AV malformations, vasculitis, previous radiotherapy
- COPD gives matched defects

CTPA

- peripheral emboli affecting subsegmental arteries may be missed

Pulmonary angiography

- the gold standard
- significant complication rate compared to other investigations

1. Clinical Characteristics of Patients with Acute Pulmonary Embolism(Data from PIOPED II) Am J Med. Oct 2007; 120(10): 871879.

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Next

A 27-year-old man presents for review. Around six months he started work at a garage which specialises in the spray painting of cars. Over the past few weeks he has been having increasing problems with a cough and wheeze during the daytime. He wonders if it may be related to his work as his symptoms improved following a recent two week holiday to Greece. You give him a peak flow meter. An average of the results are shown below:

Average peak flow	
Days at work	510 l/min
Days not at work	630 l/min

What is the most appropriate course of action?

- ☐ A. Prescribe a corticosteroid inhaler + a salbutamol inhaler
- ☐ B. Prescribe a salbutamol inhaler for work days
- ☐ C. Arrange spirometry
- ☐ D. Advise him to quit his job
- ☒ E. Refer to respiratory

Next question

Patients with suspected occupational asthma should be referred to a respiratory specialist

Asthma: occupational

Patients may either present with concerns that chemicals at work are worsening their asthma or you may notice in the history that symptoms seem better at weekends / when away from work.

Exposure to the following chemicals is associated with occupational asthma:

- isocyanates - the most common cause. Example occupations include spray painting and foam moulding using adhesives
- platinum salts
- soldering flux resin
- glutaraldehyde
- flour
- epoxy resins
- proteolytic enzymes

Serial measurements of peak expiratory flow are recommended at work and away from work.

Referral should be made to a respiratory specialist for patients with suspected occupational asthma.

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[Next](#)

Theme: Haemoptysis

A.	Lung cancer
B.	Pulmonary embolism
C.	Goodpasture's syndrome
D.	Tuberculosis
E.	Aortic regurgitation
F.	Mitral stenosis
G.	Coccidiomycosis
H.	Aspergilloma
I.	Wegener's granulomatosis
J.	Bronchiectasis

For each of the following scenarios select the most likely diagnosis:

21. A 52-year-old man who was born in India presents with episodic haemoptysis. His only history is tuberculosis as an adolescent. Chest x-ray shows a rounded opacity in the right upper zone surrounded by a rim of air

The correct answer is Aspergilloma

22. A 71-year-old woman presents with dyspnoea and haemoptysis for the past two weeks. Clinical examination reveals a loud first heart sound, a diastolic murmur and new-onset atrial fibrillation

The correct answer is Mitral stenosis

23. A 62-year-old woman who is being investigated for renal impairment presents with haemoptysis. On examination she has a flat nose

The correct answer is Wegener's granulomatosis

[Next question](#)

Haemoptysis

The table below lists the main characteristics of the most important causes of haemoptysis:

Diagnosis	Notes
Lung cancer	History of smoking Symptoms of malignancy: weight loss, anorexia
Pulmonary oedema	Dyspnoea Bibasal crackles and S3 are the most reliable signs

Tuberculosis	Fever, night sweats, anorexia, weight loss
Pulmonary embolism	Pleuritic chest pain Tachycardia, tachypnoea
Lower respiratory tract infection	Usually acute history of purulent cough
Bronchiectasis	Usually long history of cough and daily purulent sputum production
Mitral stenosis	Dyspnoea Atrial fibrillation Malar flush on cheeks Mid-diastolic murmur
Aspergilloma	Often past history of tuberculosis. Haemoptysis may be severe Chest x-ray shows rounded opacity
Wegener's granulomatosis	Upper respiratory tract: epistaxis, sinusitis, nasal crusting Lower respiratory tract: dyspnoea, haemoptysis Glomerulonephritis Saddle-shape nose deformity
Goodpasture's syndrome	Haemoptysis Systemically unwell: fever, nausea Glomerulonephritis

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Next

A 17-year-old male with a history of cystic fibrosis presents to clinic for annual review. What is the most appropriate advice regarding his diet?

- ☐ A. High calorie and low fat with pancreatic enzyme supplementation for every meal
- ☐ B. High calorie and low fat with pancreatic enzyme supplementation for evening

		meal
<input type="radio"/>	C.	Normal calorie and low fat with pancreatic enzyme supplementation for every meal
<input type="radio"/>	D.	High calorie and high fat with pancreatic enzyme supplementation for evening meal
✓ <input checked="" type="radio"/>	E.	High calorie and high fat with pancreatic enzyme supplementation for every meal

Next question

Please see the link for more details.

Cystic fibrosis: management

Management of cystic fibrosis involves a multidisciplinary approach

Key points

- regular (at least twice daily) chest physiotherapy and postural drainage. Parents are usually taught to do this. Deep breathing exercises are also useful
- high calorie diet, including high fat intake*
- vitamin supplementation
- pancreatic enzyme supplements taken with meals
- heart and lung transplant

*this is now the standard recommendation - previously high calorie, low-fat diets have been recommended to reduce the amount of steatorrhoea

Question 25 of 110

Next

A 60-year-old man is diagnosed with idiopathic pulmonary fibrosis after presenting with an 18 month history of progressive dyspnoea. His latest FVC is 60% of predicted. What is the average life expectancy for such a patient?

- | | |
|----------------------------------|-----------------|
| <input type="radio"/> | A. 3-6 months |
| <input type="radio"/> | B. 6-12 months |
| <input type="radio"/> | C. 12-18 months |
| <input checked="" type="radio"/> | D. 3-4 years |
| <input type="radio"/> | E. 8-12 years |

[Next question](#)

Idiopathic pulmonary fibrosis

Idiopathic pulmonary fibrosis (IPF, previously termed cryptogenic fibrosing alveolitis) is a chronic lung condition characterised by progressive fibrosis of the interstitium of the lungs. Whilst there are many causes of lung fibrosis (e.g. medications, connective tissue disease, asbestos) the term IPF is reserved when no underlying cause exists.

IPF is typically seen in patients aged 50-70 years and is twice as common in men.

Features

- progressive exertional dyspnoea
- bibasal crackles on auscultation
- dry cough
- clubbing

Diagnosis

- spirometry: classically a restrictive picture (FEV1 normal/decreased, FVC decreased, FEV1/FVC increased)
- impaired gas exchange: reduced transfer factor (TLCO)
- imaging: bilateral interstitial shadowing (typically small, irregular, peripheral opacities - 'ground-glass' - later progressing to 'honeycombing') may be seen on a chest x-ray but high-resolution CT scanning is the investigation of choice and required to make a diagnosis of IPF
- ANA positive in 30%, rheumatoid factor positive in 10% but this does not necessarily mean that the fibrosis is secondary to a connective tissue disease. Titres are usually low



© Image used on license from [Radiopaedia](#)

CT scan showing advanced pulmonary fibrosis including 'honeycombing'

Management

- pulmonary rehabilitation
- very few medications have been shown to give any benefit in IPF. There is some evidence that pirfenidone (an antifibrotic agent) may be useful in selected patients (see NICE guidelines)
- many patients will require supplementary oxygen and eventually a lung transplant

Prognosis

- poor, average life expectancy is around 3-4 years

Question 26 of 110

Next

Which one of the following interventions is most likely to increase survival in patients with COPD?

- | | |
|----------------------------------|------------------------------|
| <input type="radio"/> | A. Home nebulisers |
| <input type="radio"/> | B. Tiotropium inhaler |
| <input type="radio"/> | C. Long-term steroid therapy |
| <input checked="" type="radio"/> | D. Smoking cessation |
| <input type="radio"/> | E. Long-term oxygen therapy |

Next question

Whilst long-term oxygen therapy may increase survival in hypoxic patients, smoking cessation is the single most important intervention in patients with COPD

COPD: stable management

NICE updated it's guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 27 of 110

Next

You are doing the annual review of a 72-year-old man with chronic obstructive pulmonary disease (COPD). Last year he had three exacerbations of his COPD, one of which resulted in him being hospitalised. Today his chest is clear and his oxygen saturations are 94% on room air. According to NICE guidelines, what treatment should you offer him?

- ✓ ☒ A. A home supply of prednisolone and an antibiotic
- ☐ B. A home supply of prednisolone
- ☐ C. A home supply of an antibiotic
- ☐ D. A home nebuliser
- ☐ E. Home oxygen

Next question

In the 2010 NICE guidelines there is a recommendation that patients who have frequency exacerbations of COPD should be given a home supply of corticosteroids and antibiotics. It is of course good practice to ask the patient to contact you if they are required to use them, at least to ensure that no further action is required. An antibiotic should be only be taken if the patient is coughing up purulent sputum.

COPD: stable management

NICE updated it's guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment

- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 28 of 110

Next

One of your patients who has COPD is to start long-term oxygen therapy. What is the most appropriate way to supply this oxygen?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Oxygen cylinders supplied via Home Oxygen Order Form |
| <input type="radio"/> | B. Oxygen concentrator arranged following self-referral to local pharmacy |
| <input type="radio"/> | C. Oxygen cylinders supplied via FP10 |
| <input checked="" type="radio"/> | D. Oxygen concentrator supplied via Home Oxygen Order Form |
| <input type="radio"/> | E. Oxygen concentrator supplied via FP10 |

Next question

The Home Oxygen Order Form has replaced the FP10 for oxygen prescription. The actual supply of the oxygen is now from private companies rather than the local pharmacy.

COPD: long-term oxygen therapy

The 2010 NICE guidelines on COPD clearly define which patients should be assessed for and offered long-term oxygen therapy (LTOT). Patients who receive LTOT should breathe supplementary oxygen for at least 15 hours a day. Oxygen concentrators are used to provide a fixed supply for LTOT.

Assess patients if any of the following:

- very severe airflow obstruction (FEV1 < 30% predicted). Assessment should be 'considered' for patients with severe airflow obstruction (FEV1 30-49% predicted)
- cyanosis
- polycythaemia
- peripheral oedema
- raised jugular venous pressure
- oxygen saturations less than or equal to 92% on room air

Assessment is done by measuring arterial blood gases on 2 occasions at least 3 weeks apart in patients with stable COPD on optimal management.

Offer LTOT to patients with a pO₂ of < 7.3 kPa or to those with a pO₂ of 7.3 - 8 kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

Question 29 of 110

Next

A 65-year-old woman is investigated for a 6 week history of worsening shortness of breath, lethargy and weight loss. Her past medical history includes chronic obstructive pulmonary disease, hypertension and she is an ex-smoker. Clinical examination is unremarkable. Investigation results are as follows:

Chest x-ray

Hyperinflated lung fields, normal heart size

Bloods

Sodium	131 mmol/l
Potassium	3.4 mmol/l
Urea	7.2 mmol/l

Creatinine	101 µmol/l
Hb	10.4 g/dl
MCV	91 fl
Plt	452 * 10 ⁹ /l
WBC	3.7 * 10 ⁹ /l

What is the most appropriate management?

- ☐ A. Screen for depression
- ☐ B. Short synacthen test
-  ☒ C. Urgent referral to the chest clinic
- ☐ D. Stop bendroflumethiazide
- ☐ E. Urgent gastroscopy

Next question

Despite a normal chest x-ray an ex-smoker with shortness of breath, weight loss and hyponatraemia should be investigated on an urgent basis for lung cancer. This approach is supported by current NICE guidelines. Whilst gastrointestinal cancer is a possibility the normal MCV is not entirely consistent with chronic blood loss

Lung cancer: referral

The 2005 NICE cancer referral guidelines gave the following advice:

Consider immediate referral for patients with:

- signs of superior vena caval obstruction (swelling of the face/neck with fixed elevation of jugular venous pressure)
- stridor

Refer urgently patients with:

- persistent haemoptysis (in smokers or ex-smokers aged 40 years and older)

- a chest X-ray suggestive of lung cancer (including pleural effusion and slowly resolving consolidation)
- a normal chest X-ray where there is a high suspicion of lung cancer
- a history of asbestos exposure and recent onset of chest pain, shortness of breath or unexplained systemic symptoms where a chest x-ray indicates pleural effusion, pleural mass or any suspicious lung pathology

Refer urgently for chest x-ray for patients with any of the following:

- haemoptysis
- unexplained or persistent (longer than 3 weeks): chest and/or shoulder pain, dyspnoea, weight loss, chest signs, hoarseness, finger clubbing, cervical or supraclavicular lymphadenopathy, cough, features suggestive of metastasis from a

lung cancer (for example, secondaries in the brain, bone, liver, skin)

- underlying chronic respiratory problems with unexplained changes in existing symptoms

Question 30 of 110

Next

When assessing a patient with suspected chronic obstructive pulmonary disease, which one of the following is least relevant?

- | | |
|----------------------------------|-------------------------|
| <input type="radio"/> | A. Smoking history |
| <input type="radio"/> | B. Chest x-ray |
| <input type="radio"/> | C. Full blood count |
| <input checked="" type="radio"/> | D. Peak expiratory flow |
| <input type="radio"/> | E. Spirometry |

Next question

Peak expiratory flow is of no value in the diagnosis of COPD

COPD: investigation and diagnosis

NICE recommend considering a diagnosis of COPD in patients over 35 years of age who are smokers or ex-smokers and have symptoms such as exertional breathlessness, chronic cough or regular sputum production.

The following investigations are recommended in patients with suspected COPD:

- post-bronchodilator spirometry to demonstrate airflow obstruction: FEV1/FVC ratio less than 70%
- chest x-ray: hyperinflation, bullae, flat hemidiaphragm. Also important to exclude lung cancer
- full blood count: exclude secondary polycythaemia
- body mass index (BMI) calculation

The severity of COPD is categorised using the FEV1*:

Post-bronchodilator FEV1/FVC	FEV1 (of predicted)	Severity
< 0.7	> 80%	Stage 1 - Mild**
< 0.7	50-79%	Stage 2 - Moderate
< 0.7	30-49%	Stage 3 - Severe
< 0.7	< 30%	Stage 4 - Very severe

Measuring peak expiratory flow is of limited value in COPD, as it may underestimate the degree of airflow obstruction.


*note that the grading system has changed following the 2010 NICE guidelines. If the FEV1 is greater than 80% predicted but the post-bronchodilator FEV1/FVC is < 0.7 then this is classified as Stage 1 - mild

**symptoms should be present to diagnose COPD in these patients

Question 31 of 110

Next

You are reviewing the management of a number of patients with chronic obstructive pulmonary disease (COPD). Which one of the following factors should prompt an assessment for long-term oxygen therapy?

- ☐ A. FEV1 54% of predicted
-  ☒ B. Haemoglobin of 18.4 g/dl
- ☐ C. Body mass index 18.8 kg / m²
- ☐ D. Oxygen saturations of 93% on room air
- ☐ E. FEV1/FVC of 0.47

Next question

COPD: long-term oxygen therapy

The 2010 NICE guidelines on COPD clearly define which patients should be assessed for and offered long-term oxygen therapy (LTOT). Patients who receive LTOT should breathe supplementary oxygen for at least 15 hours a day. Oxygen concentrators are used to provide a fixed supply for LTOT.

Assess patients if any of the following:

- very severe airflow obstruction (FEV1 < 30% predicted). Assessment should be 'considered' for patients with severe airflow obstruction (FEV1 30-49% predicted)
- cyanosis
- polycythaemia
- peripheral oedema
- raised jugular venous pressure
- oxygen saturations less than or equal to 92% on room air

Assessment is done by measuring arterial blood gases on 2 occasions at least 3 weeks apart in patients with stable COPD on optimal management.

Offer LTOT to patients with a pO₂ of < 7.3 kPa or to those with a pO₂ of 7.3 - 8 kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

Question 32 of 110

Next

A 62-year-old man with a history of recurrent lower respiratory tract infections is diagnosed as having bilateral bronchiectasis following a high resolution CT scan. Which one of the following is most important in the long term control of his symptoms?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Inhaled corticosteroids |
| <input type="radio"/> | B. Prophylactic antibiotics |
| <input type="radio"/> | C. Surgery |
| <input checked="" type="radio"/> | D. Postural drainage |
| <input type="radio"/> | E. Mucolytic therapy |

Next question

Symptom control in non-CF bronchiectasis - inspiratory muscle training + postural drainage

Bronchiectasis: management

Bronchiectasis describes a permanent dilatation of the airways secondary to chronic infection or inflammation. After assessing for treatable causes (e.g. immune deficiency) management is as follows:

- physical training (e.g. inspiratory muscle training) - has a good evidence base for patients with non-cystic fibrosis bronchiectasis
- postural drainage
- antibiotics for exacerbations + long-term rotating antibiotics in severe cases
- bronchodilators in selected cases
- immunisations
- surgery in selected cases (e.g. Localised disease)

Most common organisms isolated from patients with bronchiectasis:

- *Haemophilus influenzae* (most common)
- *Pseudomonas aeruginosa*
- *Klebsiella* spp.
- *Streptococcus pneumoniae*

Question 33-35 of 110

Next

Theme: Respiratory pathogens

- | | |
|-----------|-----------------------------------|
| A. | Adenovirus |
| B. | Parainfluenza virus |
| C. | <i>Mycobacterium tuberculosis</i> |
| D. | Pneumocystis jiroveci |
| E. | Respiratory syncytial virus |
| F. | <i>Mycoplasma pneumoniae</i> |
| G. | Rhinovirus |
| H. | <i>Legionella pneumophila</i> |
| I. | <i>Streptococcus pneumoniae</i> |
| J. | Influenza virus |

For each of the following scenarios please select the most likely causative respiratory pathogen:

33. A 14-month-old boy who has a barking cough which is worse at night.

The correct answer is Parainfluenza virus

34. A 33-year-old man who is known to be HIV positive presents with cough and dyspnoea. Auscultation of his chest is unremarkable but he is noted to desaturate on exertion.

The correct answer is Pneumocystis jiroveci

35. A 30-year-old woman presents with a headache, myalgia, fever and a cough. On auscultation her chest is clear but she has a temperature of 38.6°C.

The correct answer is Influenza virus

These are typical flu symptoms. Influenza is much more common than Mycoplasma pneumonia.

[Next question](#)

Respiratory pathogens

The table below lists the more common respiratory pathogens:

Pathogen	Associated condition
Respiratory syncytial virus	Bronchiolitis
Parainfluenza virus	Croup
Rhinovirus	Common cold
Influenza virus	Flu
<i>Streptococcus pneumoniae</i>	The most common cause of community-acquired pneumonia

<i>Haemophilus influenzae</i>	Community-acquired pneumonia Most common cause of bronchiectasis exacerbations Acute epiglottitis
<i>Staphylococcus aureus</i>	Pneumonia, particularly following influenza
<i>Mycoplasma pneumoniae</i>	Atypical pneumonia Flu-like symptoms classically precede a dry cough. Complications include haemolytic anaemia and erythema multiforme
<i>Legionella pneumophila</i>	Atypical pneumonia Classically spread by air-conditioning systems, causes dry cough. Lymphopenia, deranged liver function tests and hyponatraemia may be seen
<i>Pneumocystis jiroveci</i>	Common cause of pneumonia in HIV patients. Typically patients have few chest signs and develop exertional dyspnoea
<i>Mycobacterium tuberculosis</i>	Causes tuberculosis. A wide range of presentations from asymptomatic to disseminated disease are possible. Cough, night sweats and weight loss may be seen

Question 36-38 of 110

[Next](#)

Theme: Respiratory tract infections: NICE guidelines

- A. 2 days
- B. 4 days
- C. 7 days
- D. 10 days
- E. 2 weeks
- F. 3 weeks
- G. 4 weeks

H. 5 weeks

For each one of the following respiratory tract infections select the average total illness length:

36. Acute otitis media

The correct answer is 4 days

37. Acute sore throat

The correct answer is 7 days

38. Acute bronchitis

The correct answer is 3 weeks

[Next question](#)

Respiratory tract infections: NICE guidelines

NICE issued guidance in 2008 on the management of respiratory tract infection, focusing on the prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

A no antibiotic prescribing or delayed antibiotic prescribing approach is generally recommended for patients with acute otitis media, acute sore throat/acute pharyngitis/acute tonsillitis, common cold, acute rhinosinusitis or acute cough/acute bronchitis.

However, an immediate antibiotic prescribing approach may be considered for:

- children younger than 2 years with bilateral acute otitis media

- children with otorrhoea who have acute otitis media
- patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present

The Centor criteria* are as follows:

- presence of tonsillar exudate
- tender anterior cervical lymphadenopathy or lymphadenitis
- history of fever
- absence of cough

If the patient is deemed at risk of developing complications, an immediate antibiotic prescribing policy is recommended

- are systemically very unwell
- have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications)
- are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely
- are older than 65 years with acute cough and two or more of the following, or older than 80 years with acute cough and one or more of the following:
 - - hospitalisation in previous year
 - - type 1 or type 2 diabetes
 - - history of congestive heart failure
 - - current use of oral glucocorticoids

The guidelines also suggest that patients should be advised how long respiratory tract infections may last:

- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1 1/2 weeks
- acute rhinosinusitis: 2 1/2 weeks
- acute cough/acute bronchitis: 3 weeks

*if 3 or more of the criteria are present there is a 40-60% chance the sore throat is caused by Group A beta-haemolytic *Streptococcus*

Question 39 of 110

Next

A 45-year-old woman who is a known asthmatic comes for review. In the past two years she has had around six exacerbations of asthma requiring oral steroids. Her current medication includes salbutamol 2 puffs prn, salmeterol 50mcg bd and beclometasone 200 mcg 1 puff bd. You note from the records that her BMI is 31 kg/m², she is a non-smoker and has a good inhaler technique. What is the most appropriate next step in management?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Increase beclometasone to 200 mcg 2 puffs bd |
| <input type="radio"/> | B. Referral to a dietician |
| <input type="radio"/> | C. Add oral theophylline |
| <input type="radio"/> | D. Add oral montelukast |
| <input type="radio"/> | E. Add inhaled tiotropium |

Next question

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
Step 1	Inhaled short-acting B2 agonist as required
Step 2	Add inhaled steroid at 200-800 mcg/day* 400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease
Step 3	1. Add inhaled long-acting B2 agonist (LABA) 2. Assess control of asthma: <ul style="list-style-type: none">• good response to LABA - continue LABA• benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose)• no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/ day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
Step 4	Consider trials of: <ul style="list-style-type: none">• increasing inhaled steroid up to 2000 mcg/day*• addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet• the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
Step 5	Use daily steroid tablet in lowest dose providing adequate control. Consider other treatments to minimise the use of steroid tablets Maintain high dose inhaled steroid at 2000 mcg/day* Refer patient for specialist care

*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
- have both anti-inflammatory and bronchodilatory properties
- should be used when patients are poorly controlled on high-dose inhaled corticosteroids and a long-acting b2-agonist
- particularly useful in aspirin-induced asthma
- associated with the development of Churg-Strauss syndrome

Fluticasone is more lipophilic and has a longer duration of action than beclometasone

Hydrofluoroalkane is now replacing chlorofluorocarbon as the propellant of choice. Only half the usually dose is needed with hydrofluoroalkane due to the smaller size of the particles

Long acting B2-agonists acts as bronchodilators but also inhibit mediator release from mast cells. Recent meta-analysis showed adding salmeterol improved symptoms compared to doubling the inhaled steroid dose

Question 40 of 110

Next

You are reviewing a patient with chronic obstructive pulmonary disease. Which one of the following best describes the vaccinations they should receive?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Annual influenza + annual pneumococcal |
| <input type="radio"/> | B. Annual influenza + one-off pneumococcal + one-off Hib booster |
| <input checked="" type="radio"/> | C. Annual influenza + one-off pneumococcal |
| <input type="radio"/> | D. Annual influenza + pneumococcal every 5 years |
| <input type="radio"/> | E. Annual influenza |

Next question

COPD: stable management

NICE updated its guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 41 of 110

Next

Which one of the following statements is true regarding the difference between Qvar and CFC-containing beclometasone inhalers?

- | | |
|-----------------------|---|
| <input type="radio"/> | A. Qvar is the only CFC-free beclometasone inhaler currently available |
| <input type="radio"/> | B. There are no studies comparing Qvar to CFC-containing beclometasone inhalers |



C. The equivalent dose of Qvar is lower than that of CFC-containing beclometasone inhalers



D. Qvar must be taken 4 times per day



E. New prescriptions should be labelled 'CFC-free beclometasone inhaler'

Next question

The BNF advises that 100mcg of Qvar should be prescribed for 200-250 mcg of CFC-containing beclometasone dipropionate. CFC-free beclometasone inhalers should be prescribed by brand as other preparations are available with different potencies (e.g. Clenil Modulite).

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
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Step 2	Add inhaled steroid at 200-800 mcg/day* 400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease
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Step 4	Consider trials of: <ul style="list-style-type: none">• increasing inhaled steroid up to 2000 mcg/day*• addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet

	<ul style="list-style-type: none"> the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
Step 5	<p>Use daily steroid tablet in lowest dose providing adequate control. Consider other treatments to minimise the use of steroid tablets</p> <p>Maintain high dose inhaled steroid at 2000 mcg/day*</p> <p>Refer patient for specialist care</p>

*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
- have both anti-inflammatory and bronchodilatory properties
- should be used when patients are poorly controlled on high-dose inhaled corticosteroids and a long-acting b2-agonist
- particularly useful in aspirin-induced asthma
- associated with the development of Churg-Strauss syndrome

Fluticasone is more lipophilic and has a longer duration of action than beclometasone

Hydrofluoroalkane is now replacing chlorofluorocarbon as the propellant of choice. Only half the usually dose is needed with hydrofluoroalkane due to the smaller size of the particles

Long acting B2-agonists acts as bronchodilators but also inhibit mediator release from mast cells. Recent meta-analysis showed adding salmeterol improved symptoms compared to doubling the inhaled steroid dose

Question 42 of 110

Next

A 41-year-old female presents with 3 day history of a dry cough and shortness of breath. This was preceded by flu-like symptoms. On examination there is a symmetrical, erythematous rash with 'target' lesions over the whole body. What is the likely organism causing the symptoms?

- ☐ A. *Pseudomonas*
- ☐ B. *Staphylococcus aureus*
- ☒ C. *Mycoplasma pneumoniae*
- ☐ D. *Chlamydia pneumoniae*
- ☐ E. *Legionella pneumophila*

Next question

Pneumococcus may also cause erythema multiforme

Mycoplasma pneumoniae

Mycoplasma pneumoniae is a cause of atypical pneumonia which often affects younger patients. It is associated with a number of characteristic complications such as erythema multiforme and cold autoimmune haemolytic anaemia. Epidemics of *Mycoplasma pneumoniae* classically occur every 4 years. It is important to recognise atypical pneumonias as they may not respond to penicillins or cephalosporins due to it lacking a peptidoglycan cell wall.

Features

- the disease typically has a prolonged and gradual onset
- flu-like symptoms classically precede a dry cough
- bilateral consolidation on x-ray
- complications may occur as below

Complications

- cold agglutins (IgM) may cause an haemolytic anaemia, thrombocytopenia
- erythema multiforme, erythema nodosum
- meningoencephalitis, Guillain-Barre syndrome

- bullous myringitis: painful vesicles on the tympanic membrane
- pericarditis/myocarditis
- gastrointestinal: hepatitis, pancreatitis
- renal: acute glomerulonephritis

Investigations

- diagnosis is generally by Mycoplasma serology
- positive cold agglutination test

Management

- erythromycin/clarithromycin
- tetracyclines such as doxycycline are an alternative

Question 43 of 110

Next

A 26-year-old female presents to the surgery due to an exacerbation of her asthma. On examination her peak flow is 300 l/min (usual 450 l/min) and she can complete sentences. Pulse is 90 bpm and the respiratory rate is 18 / min. Examination of the chest reveals a bilateral expiratory wheeze but is otherwise unremarkable. What is the most appropriate management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Oxygen + nebulised salbutamol + allow home if settles with follow-up review |
| <input type="radio"/> | B. Oxygen + nebulised salbutamol + advise to double inhaled steroids + allow home if settles with follow-up review |
| <input checked="" type="radio"/> | C. Nebulised salbutamol + prednisolone + allow home if settles with follow-up review |
| <input type="radio"/> | D. Oxygen + nebulised salbutamol + prednisolone + immediate admission |
| <input type="radio"/> | E. Nebulised salbutamol + advise to double inhaled steroids + allow home if settles with follow-up review |

Next question

The British Thoracic Society give specific recommendations on dealing with acute asthma in primary care - please see the link

Asthma: assessment and management in primary care

Patients with acute asthma are stratified into moderate, severe or life-threatening

Moderate	Severe	Life-threatening
<ul style="list-style-type: none">❖ PEFR > 50% best or predicted❖ Speech normal❖ RR < 25 / min❖ Pulse < 110 bpm	<ul style="list-style-type: none">❖ PEFR 33 - 50% best or predicted❖ Can't complete sentences❖ RR > 25/min❖ Pulse > 110 bpm	<ul style="list-style-type: none">❖ PEFR < 33% best or predicted❖ Oxygen sats < 92%❖ Silent chest, cyanosis or feeble respiratory effort❖ Bradycardia, dysrhythmia or hypotension❖ Exhaustion, confusion or coma

Management of moderate asthma

- beta 2 agonists such as salbutamol, either nebulised or via a spacer (4-6 puffs, given one at a time and inhaled separately, repeated at intervals of 10-20 minutes)
- if PEFR between 50-75% then prednisolone 40-50mg

Management of severe asthma

- consider admission
- oxygen to hypoxaemic patients to maintain a SpO₂ of 94-98%
- beta 2 agonists such as salbutamol, either nebulised or via a spacer (4-6 puffs, given one at a time and inhaled separately, repeated at intervals of 10-20 minutes)
- prednisolone 40-50mg
- if no response then admit

Management of life-threatening asthma

- arrange immediate admission (999 call)
- oxygen to hypoxaemic patients to maintain a SpO₂ of 94-98%
- nebulised beta 2 agonists (e.g. Salbutamol) + ipratropium
- prednisolone 40-50mg or IV hydrocortisone 100mg

Question 44 of 110

Next

According to recent NICE guidelines on the management of respiratory tract infections, which one of the following patients should not be considered for immediate antibiotic prescribing:

- ✓ ☒ **A.** A 12-year-old who has acute sinusitis and a temperature of 37.6°C
- ☐ **B.** A 23-year-old woman who has acute tonsillitis. Her temp is 37.8°C, tonsillar exudate is seen and there is tender lymph nodes
- ☐ **C.** A 5-year-old who has acute otitis media associated with otorrhoea
- ☐ **D.** A 7-month old who has bilateral otitis media and is apyrexial
- ☐ **E.** An 18-month old who has bilateral otitis media and a temperature of 38.1°C

Next question

Antibiotics are not recommended for uncomplicated sinusitis.

Respiratory tract infections: NICE guidelines

NICE issued guidance in 2008 on the management of respiratory tract infection, focusing on the prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

A no antibiotic prescribing or delayed antibiotic prescribing approach is generally recommended for patients with acute otitis media, acute sore throat/acute pharyngitis/acute tonsillitis, common cold, acute rhinosinusitis or acute cough/acute bronchitis.

However, an immediate antibiotic prescribing approach may be considered for:

- children younger than 2 years with bilateral acute otitis media
- children with otorrhoea who have acute otitis media
- patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present

The Centor criteria* are as follows:

- presence of tonsillar exudate
- tender anterior cervical lymphadenopathy or lymphadenitis

- history of fever
- absence of cough

If the patient is deemed at risk of developing complications, an immediate antibiotic prescribing policy is recommended

- are systemically very unwell
- have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications)
- are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely
- are older than 65 years with acute cough and two or more of the following, or older than 80 years with acute cough and one or more of the following:
 - - hospitalisation in previous year
 - - type 1 or type 2 diabetes
 - - history of congestive heart failure
 - - current use of oral glucocorticoids

The guidelines also suggest that patients should be advised how long respiratory tract infections may last:

- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1 1/2 weeks
- acute rhinosinusitis: 2 1/2 weeks
- acute cough/acute bronchitis: 3 weeks

*if 3 or more of the criteria are present there is a 40-60% chance the sore throat is caused by Group A beta-haemolytic *Streptococcus*

Question 45 of 110

Next

A 54-year-old woman with a long history of rheumatoid arthritis is reviewed in clinic complaining of shortness of breath. Oxygen saturations are 92% on room air with spirometry showing a restrictive pattern associated with a reduced transfer factor. Which one of the following drugs is most likely to be responsible?

- | | |
|----------------------------------|-----------------------|
| <input type="radio"/> | A. Depomedrone |
| <input type="radio"/> | B. Hydroxychloroquine |
| <input checked="" type="radio"/> | C. Methotrexate |
| <input type="radio"/> | D. Ciclosporin |
| <input type="radio"/> | E. Celecoxib |

Next question

Amiodarone & methotrexate are common causes of lung fibrosis

This patient has pulmonary fibrosis which may be caused by methotrexate. Other anti-rheumatoid drugs such as sulfasalazine and gold may also cause pulmonary fibrosis

Drugs causing lung fibrosis**Causes**

- amiodarone
- cytotoxic agents: busulphan, bleomycin
- anti-rheumatoid drugs: methotrexate, sulfasalazine, gold
- nitrofurantoin
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide)

Question 46 of 110

Next

A 25-year-old woman presents for her annual asthma review. She is currently using a combination salbutamol 100mcg prn and Clenil (beclometasone dipropionate) 400mcg bd. Despite this treatment her asthma is poorly controlled and she has required a course of oral prednisolone around two months ago. What did the 2014 National Review of Asthma Deaths suggest as the most appropriate next step in management?

- ☐ A. Add a leukotriene receptor antagonist
- ☐ B. Add a long-acting beta agonist inhaler
- ☒ C. Stop Clenil and start a combination corticosteroid + long-acting beta agonist inhaler
- ☐ D. Increase the dose of Clenil to 800mcg bd
- ☐ E. Add a tiotropium inhaler

Next question

Combination ICS + LABA inhalers should be used in preference to single-agent inhalers

The 2014 National Review of Asthma Deaths highlighted the importance of using combined inhalers where possible.

The use of combination inhalers should be encouraged. Where long-acting beta agonist (LABA) bronchodilators are prescribed for people with asthma, they should be prescribed with an inhaled corticosteroid in a single combination inhaler.

Asthma: National Review of Asthma Deaths

In 2014 the Royal College of Physicians (RCP) published a review, 'Why asthma still kills: The National Review of Asthma Deaths (NRAD)', which received widespread media coverage. This detailed review looked at 195 asthma deaths which occurred over a 12 month period. Much of this media focus was angled at poor GP management of patients with asthma. The following is a selected set of findings and recommendations. Please see the full report for a complete list - a link is provided.

Key findings of the report included:

- personal asthma action plans, acknowledged to improve asthma care, were known to be provided to only 44 (23%) of the 195 people who died from asthma
- there was no evidence that an asthma review had taken place in general practice in the last year before death for 84 (43%) of the 195 people who died
- the expert panels identified factors that could have avoided death in relation to the health professionals implementation of asthma guidelines in 89 (46%) of the 195 deaths, including lack of specific asthma expertise in 34 (17%) and lack of knowledge of the UK asthma guidelines in 48 (25%)
- inappropriate prescribing of long-acting beta agonist (LABA) bronchodilator inhalers. 27 (14%) of those who died were prescribed a single-component LABA bronchodilator at the time of death. At least five (3%) patients were on LABA monotherapy without inhaled corticosteroid preventer treatment

Selected recommendations include:

- referral to secondary care should be made if patients have required more than two courses of systemic corticosteroids, oral or injected, in the previous 12 months or require management using British Thoracic Society (BTS) stepwise treatment 4 or 5 to achieve control
- all patients who have been prescribed more than 12 reliever inhalers in the past 12 months should be invited for urgent review of their asthma control
- an assessment of inhaler technique should be routinely undertaken and formally documented at annual review
- non-adherence to inhaled corticosteroids is associated with increased risk of poor asthma control and should be continually monitored
- the use of combination inhalers should be encouraged. Where long-acting beta agonist (LABA) bronchodilators are prescribed for people with asthma, they should be prescribed with an inhaled corticosteroid in a single combination inhaler

Question 47 of 110

Next

You review a 60-year-old woman in the COPD clinic. She was diagnosed with COPD four years ago and is currently maintained on a salbutamol inhaler as required and a tiotropium inhaler regularly. She has recently managed to give up smoking and her latest FEV1 was 42% of predicted. Despite her current therapy she is have frequent exacerbations. What is the most appropriate next step in her management?

- ☐ A. Salmeterol inhaler
- ☒ B. Combined salmeterol + fluticasone inhaler
- ☐ C. Long term oxygen therapy
- ☐ D. Betamethasone inhaler
- ☐ E. Oral aminophylline

Next question

Following the 2010 NICE guidelines the next step in management would be a combined long-acting beta2-agonist (LABA) with an inhaled corticosteroid (ICS).

COPD: stable management

NICE updated it's guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 48 of 110

Next

A 19-year-old man presents as he is concerned he may be asthmatic. Which one of the following points in the history would make this diagnosis less likely?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Smoking since age of 16 years |
| <input checked="" type="radio"/> | B. Peripheral tingling during episodes of dyspnoea |
| <input type="radio"/> | C. Peripheral blood eosinophilia |
| <input type="radio"/> | D. Chest tightness whilst exercising |
| <input type="radio"/> | E. History of eczema |

Next question

The British Thoracic Society suggest peripheral tingling is one of the factors which makes a diagnosis of asthma less likely. His smoking history does not preclude a diagnosis of asthma

Asthma: diagnosis in adults

Whilst the diagnosis of asthma remains largely clinical, the British Thoracic Society (BTS) guidelines do offer some guidance on how we should approach this problem, for both adults and children. They recommend we classify patients as having either a high, intermediate or low probability of asthma based on the presence or absence of certain symptoms:

For adults it is recommend that they have a **clinical assessment including spirometry** (or Peak Expiratory Flow measurement if spirometry is not available):

When assessing patients we should therefore look for symptoms which may support a diagnosis of asthma, and those which may point to an alternative diagnosis. The BTS produced a list of features which are helpful when deciding this:

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:</p> <ul style="list-style-type: none"> • symptoms worse at night and in the early morning • symptoms in response to exercise, allergen exposure and cold air • symptoms after taking aspirin or beta blockers <p>History of atopic disorder</p> <p>Family history of asthma and/or atopic disorder</p> <p>Widespread wheeze heard on auscultation of the chest</p> <p>Otherwise unexplained low FEV1 or PEF (historical or serial readings)</p> <p>Otherwise unexplained peripheral blood eosinophilia</p>	<p>Prominent dizziness, light-headedness, peripheral tingling</p> <p>Chronic productive cough in the absence of wheeze or breathlessness</p> <p>Repeatedly normal physical examination of chest when symptomatic</p> <p>Voice disturbance</p> <p>Symptoms with colds only</p> <p>Significant smoking history (ie > 20 pack-years)</p> <p>Cardiac disease</p> <p>Normal PEF or spirometry when symptomatic</p>

If a patient has many symptoms which make a diagnosis of asthma more likely (i.e. a **high probability**) then the BTS recommend that we start a trial of treatment. A good response is considered a positive 'test of reversibility'. If a patient has a poor response to treatment then further investigations should be considered.

What is the most appropriate initial treatment?

The BTS state the following:

Patients should start treatment at the step most appropriate to the initial severity of their asthma

This means that for some patients prescribing a corticosteroid inhaler in addition to a salbutamol inhaler is appropriate. The BTS suggest the following patients would benefit from a corticosteroid inhaler:

Inhaled steroids should be considered for patients with any of the following asthma-related features:

- *exacerbations of asthma in the last two years*
- *using inhaled β_2 agonists three times a week or more*
- *symptomatic three times a week or more*
- *waking one night a week*

The last two points are probably the most relevant to newly diagnosed patients.

For patients with a **low probability** of asthma then an alternative diagnosis should be sought. Further investigations and referral to a respiratory specialist should be considered.

If a patient has an **intermediate probability** of asthma the BTS recommend *'to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a diagnosis and establishing maintenance treatment.'* The accompanying algorithm suggests this decision should be partly guided by the FEV₁/FVC ratio - a ratio of < 0.7 is suggestive of asthma.

It should of course be noted that spirometry may be normal in asymptomatic patients so it may be necessary to repeat spirometry or peak flow readings on a number of occasions in patients where the diagnosis is not clear.

Recent studies have shown the limited value of other 'objective' tests. It is now recognised that in patients with normal or near-normal pre-treatment lung function there is little room for measurable improvement in FEV1 or peak flow.

A > 400 ml improvement in FEV1 is considered significant

- before and after 400 mcg inhaled salbutamol in patients with diagnostic uncertainty and airflow obstruction present at the time of assessment
- if there is an incomplete response to inhaled salbutamol, after either inhaled corticosteroids (200 mcg twice daily beclometasone equivalent for 6-8 weeks) or oral prednisolone (30 mg once daily for 14 days)

It is now advised to interpret peak flow variability with caution due to the poor sensitivity of the test

- diurnal variation % = [(Highest - Lowest PEFr) / Highest PEFr] x 100
- assessment should be made over 2 weeks
- greater than 20% diurnal variation is considered significant

Question 49 of 110

Next

A 60-year-old woman who has recently been diagnosed with chronic obstructive pulmonary disease (COPD) presents for review. She is still occasionally breathless despite using a short-acting muscarinic antagonist (SAMA) as required. Her FEV1 is 45% of predicted and she has managed to stop smoking. Of the following options, which one is the most appropriate next step in management?

- ☐ A. Switch to a combined short-acting beta2-agonist and muscarinic antagonist inhaler (e.g. Combivent)
- ☐ B. Long-acting beta2-agonist
- ☒ C. Long-acting beta2-agonist + inhaled corticosteroid (ICS) in a combination inhaler
- ☐ D. Inhaled corticosteroid
- ☐ E. Use the SAMA regularly (e.g. 2 puffs qds)

Next question

Another option here is a long-acting muscarinic antagonist (LAMA), for example tiotropium. Please see the 2010 NICE guidelines for more details.

COPD: stable management

NICE updated its guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment

- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 50 of 110

Next

A 64-year-old woman presents to surgery with a cough, fever, diarrhoea and myalgia. The cough is non-productive and has been getting gradually worse since she returned from holiday in Spain one week ago. Her husband is concerned because over the past 24 hours she has become more drowsy and febrile. He initially thought she had the 'flu but her symptoms have got progressively worse. She is normally fit and well but drinks around 20 units of alcohol per week.

On examination pulse is 76/min, blood pressure 104/62 mmHg, oxygen saturations are 94% on room air and temperature is 38.4°C. Bilateral coarse crackles are heard in the chest.

You take some bloods which are reported the next day:

Hb	13.6 g/dl
Platelets	$311 \times 10^9/l$
WBC	$14.2 \times 10^9/l$
Na ⁺	131 mmol/l
K ⁺	4.3 mmol/l
Urea	9.2 mmol/l
Creatinine	91 μ mol/l
Bilirubin	12 μ mol/l
ALP	31 u/l
ALT	64 u/l

What is the most likely causative organism?

- ☐ A. *Streptococcus pneumoniae*
- ☐ B. *Mycoplasma pneumoniae*



C. *Legionella pneumophila*



D. *Klebsiella pneumoniae*



E. *Staphylococcus aureus*

[Next question](#)

There are a number of features here which strongly suggest Legionella:

- recent foreign travel
- flu-like symptoms
- hyponatraemia

Legionella

Legionnaire's disease is caused by the intracellular bacterium *Legionella pneumophila*. It typically colonizes water tanks and hence questions may hint at air-conditioning systems or foreign holidays. Person-to-person transmission is not seen

Features

- flu-like symptoms including fever (present in > 95% of patients)
- dry cough
- relative bradycardia
- confusion
- lymphopaenia
- hyponatraemia
- deranged liver function tests
- pleural effusion: seen in around 30% of patients

Diagnosis

- urinary antigen

Management

- treat with erythromycin

Question 51 of 110

Next

Which one of the following statements regarding the SMART trial is correct?

LABA = long-acting beta agonist

ICS = inhaled corticosteroid

- | | | |
|----------------------------------|----|--|
| <input type="radio"/> | A. | It compared the use of separate LABA and ICS inhalers with combination inhalers |
| <input type="radio"/> | B. | It showed that salmeterol can be used successfully as a reliever inhaler |
| <input checked="" type="radio"/> | C. | It supported the use of Symbicort as both a reliever and preventer inhaler |
| <input type="radio"/> | D. | It demonstrate that patients on higher doses of inhaled corticosteroids are at an increased risk of sudden death |
| <input type="radio"/> | E. | It supported the use of LABA therapy without concurrent ICS |

Next question

SMART trial - Symbicort used as both a preventer and reliever inhaler

Long-acting beta agonists

Long-acting beta agonists (LABA) are recommend at stage 3 of the British Thoracic Society (BTS) asthma management guideline.

Currently there is a debate about whether LABAs should be prescribed as an individual inhaler or as part of a combination inhaler with inhaled corticosteroids. There are also long-standing concerns about the safety profile of LABAs. Some of these issues were looked at in a 2013 BMJ article 'Long acting 2 agonists in adult asthma' BMJ 2013;347:f4662

Safety of LABA

- some patients may be taking LABA without inhaled corticosteroids (ICS). This may result from either prescribers incorrectly following the BTS asthma guidelines or patient choosing only to take the LABA (possibly to fears about the long-term effects of steroids)
- using LABA without ICS has been associated with worse asthma outcomes

Combination LABA/ICS

- the current BTS guidelines suggest 'adding' a LABA inhaler at step 3
- over recent years there has however been some movement towards using combination inhalers
- in the 2008 Drug Safety Update the MHRA recommended: 'To aid compliance with the concomitant use of inhaled corticosteroids and LABA, a combination inhaler should be used when appropriate'
- in the 2014 National Review of Asthma Deaths the following recommendation was made 'the use of combination inhalers should be encouraged. Where long-acting beta agonist (LABA) bronchodilators are prescribed for people with asthma, they should be prescribed with an inhaled corticosteroid in a single combination inhaler'

SMART trial

- the Single inhaler Maintenance and Reliever Therapy, or SMART trial looked at the use of Symbicort as a single combination inhaler used as both a reliever and a regular preventer. Symbicort contains the LABA formoterol which has a much more rapid onset of action than salmeterol. This allows it to be used as a reliever inhaler in this trial
- the trial compared Symbicort alone (as a preventer and reliever) with Symbicort as a preventer and salbutamol as the reliever
- the Symbicort only group had better outcomes
- the mean time to exacerbation for Symbicort only was 209 days vs. 134 days for the Symbicort + salbutamol group

Question 52 of 110

Next

A 28-year-old woman presents with a persistent cough and feeling of wheeziness after exercising. Which one of the following would make a diagnosis of asthma more likely?

- | | |
|-----------------------|--|
| <input type="radio"/> | A. Only gets symptoms after having a viral upper respiratory tract infection |
| <input type="radio"/> | B. Peripheral pins and needles during an episode |



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | C. Symptoms worsen after taking aspirin |
| <input type="radio"/> | D. Otherwise explained neutrophilia on the full blood count |
| <input type="radio"/> | E. Cough productive of small amounts of clear sputum |

Next question

Having a cough productive of sputum, only having symptoms after an URTI and peripheral pins and needles all make a diagnosis of asthma less likely.

Asthma: diagnosis in adults

Whilst the diagnosis of asthma remains largely clinical, the British Thoracic Society (BTS) guidelines do offer some guidance on how we should approach this problem, for both adults and children. They recommend we classify patients as having either a high, intermediate or low probability of asthma based on the presence or absence of certain symptoms:

For adults it is recommended that they have a **clinical assessment including spirometry** (or Peak Expiratory Flow measurement if spirometry is not available):

When assessing patients we should therefore look for symptoms which may support a diagnosis of asthma, and those which may point to an alternative diagnosis. The BTS produced a list of features which are helpful when deciding this:

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:</p> <ul style="list-style-type: none">• symptoms worse at night and in the early morning• symptoms in response to exercise, allergen exposure and cold air• symptoms after taking aspirin or beta blockers <p>History of atopic disorder</p> <p>Family history of asthma and/or atopic disorder</p> <p>Widespread wheeze heard on auscultation of the chest</p>	<p>Prominent dizziness, light-headedness, peripheral tingling</p> <p>Chronic productive cough in the absence of wheeze or breathlessness</p> <p>Repeatedly normal physical examination of chest when symptomatic</p> <p>Voice disturbance</p> <p>Symptoms with colds only</p> <p>Significant smoking history (ie > 20 pack-years)</p>

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>Otherwise unexplained low FEV1 or PEF (historical or serial readings)</p> <p>Otherwise unexplained peripheral blood eosinophilia</p>	<p>Cardiac disease</p> <p>Normal PEF or spirometry when symptomatic</p>

If a patient has many symptoms which make a diagnosis of asthma more likely (i.e. a **high probability**) then the BTS recommend that we start a trial of treatment. A good response is considered a positive 'test of reversibility'. If a patient has a poor response to treatment then further investigations should be considered.

What is the most appropriate initial treatment?

The BTS state the following:

Patients should start treatment at the step most appropriate to the initial severity of their asthma

This means that for some patients prescribing a corticosteroid inhaler in addition to a salbutamol inhaler is appropriate. The BTS suggest the following patients would benefit from a corticosteroid inhaler:

Inhaled steroids should be considered for patients with any of the following asthma-related features:

- *exacerbations of asthma in the last two years*
- *using inhaled β_2 agonists three times a week or more*
- *symptomatic three times a week or more*
- *waking one night a week*

The last two points are probably the most relevant to newly diagnosed patients.

For patients with a **low probability** of asthma then an alternative diagnosis should be sought. Further investigations and referral to a respiratory specialist should be considered.

If a patient has an **intermediate probability** of asthma the BTS recommend 'to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a

diagnosis and establishing maintenance treatment. '. The accompanying algorithm suggests this decision should be partly guided by the FEV₁/FVC ratio - a ratio of < 0.7 is suggestive of asthma.

It should of course be noted that spirometry may be normal in asymptomatic patients so it may be necessary to repeat spirometry or peak flow readings on a number of occasions in patients where the diagnosis is not clear.

Recent studies have shown the limited value of other 'objective' tests. It is now recognised that in patients with normal or near-normal pre-treatment lung function there is little room for measurable improvement in FEV1 or peak flow.

A > 400 ml improvement in FEV1 is considered significant

- before and after 400 mcg inhaled salbutamol in patients with diagnostic uncertainty and airflow obstruction present at the time of assessment
- if there is an incomplete response to inhaled salbutamol, after either inhaled corticosteroids (200 mcg twice daily beclometasone equivalent for 6-8 weeks) or oral prednisolone (30 mg once daily for 14 days)

It is now advised to interpret peak flow variability with caution due to the poor sensitivity of the test

- diurnal variation % = [(Highest - Lowest PEFr) / Highest PEFr] x 100
- assessment should be made over 2 weeks
- greater than 20% diurnal variation is considered significant

Question 53 of 110

Next

A 54-year-old woman with a 30-pack-year history of smoking presents due to increasing breathlessness. A diagnosis of chronic obstructive pulmonary disease (COPD) is suspected. Which of the following diagnostic criteria should be used when assessing a patient with suspected COPD?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. FEV1 > 70% of predicted value + FEV1/FVC < 60% |
| <input checked="" type="radio"/> | B. FEV1/FVC < 70% + symptoms suggestive of COPD |

- ☐ C. FEV1 < 70% of predicted value + FEV1/FVC < 70%
- ☐ D. FEV1 < 80% of predicted value + FEV1/FVC < 60%
- ☐ E. FEV1 < 70% of predicted value + FEV1/FVC > 70%

Next question

Please see the 2010 NICE guidelines for further details. Patients can now be diagnosed with 'mild' COPD if their FEV1 predicted is > 80% if they have symptoms suggestive of COPD.

COPD: investigation and diagnosis

NICE recommend considering a diagnosis of COPD in patients over 35 years of age who are smokers or ex-smokers and have symptoms such as exertional breathlessness, chronic cough or regular sputum production.

The following investigations are recommended in patients with suspected COPD:

- post-bronchodilator spirometry to demonstrate airflow obstruction: FEV1/FVC ratio less than 70%
- chest x-ray: hyperinflation, bullae, flat hemidiaphragm. Also important to exclude lung cancer
- full blood count: exclude secondary polycythaemia
- body mass index (BMI) calculation

The severity of COPD is categorised using the FEV1*:

Post-bronchodilator FEV1/FVC	FEV1 (of predicted)	Severity
< 0.7	> 80%	Stage 1 - Mild**
< 0.7	50-79%	Stage 2 - Moderate
< 0.7	30-49%	Stage 3 - Severe
< 0.7	< 30%	Stage 4 - Very severe

Measuring peak expiratory flow is of limited value in COPD, as it may underestimate the degree of airflow obstruction.

*note that the grading system has changed following the 2010 NICE guidelines. If the FEV1 is greater than 80% predicted but the post-bronchodilator FEV1/FVC is < 0.7 then this is classified as Stage 1 - mild

**symptoms should be present to diagnose COPD in these patients

Question 54 of 110

Next

A 54-year-old woman with chronic obstructive pulmonary disease (COPD) is prescribed an inhaled corticosteroid. What is the main therapeutic benefit of inhaled corticosteroids in patients with COPD?

- | | |
|----------------------------------|---------------------------------------|
| <input type="radio"/> | A. Reduced severity of exacerbations |
| <input type="radio"/> | B. Improved all cause mortality |
| <input type="radio"/> | C. Reduced use of bronchodilators |
| <input type="radio"/> | D. Slows decline in FEV1 |
| <input checked="" type="radio"/> | E. Reduced frequency of exacerbations |

Next question

COPD - reason for using inhaled corticosteroids - reduced exacerbations

COPD: stable management

NICE updated it's guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice

- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 55 of 110

Next

Your next patient is a 34-year-old accountant who has come for their annual review. Until around two years ago they used just a salbutamol inhaler as required. At this point he managed to stop smoking. Following a series of exacerbations he was started on a corticosteroid inhaler and currently takes Clenil (beclometasone dipropionate) 400mcg bd. The patient reports that his asthma control has been 'good' for the past six months or so. He has had to use his asthma inhaler twice over the past six months, both times after going for a long jog. His peak flow today is 520 l/min which is 90% of the best value recorded 5 years ago but up from the 510 l/min recorded 12 months ago. His inhaler technique is good. What is the most appropriate next step in management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Make no changes |
| <input type="radio"/> | B. Stop the Clenil inhaler |
| <input checked="" type="radio"/> | C. Decrease the Clenil dose to 200mcg bd |
| <input type="radio"/> | D. Add salmeterol |
| <input type="radio"/> | E. Perform a chest x-ray |

Next question

Good asthma control? Consider stepping down treatment

The British Thoracic Society guidelines encourage us to 'step-down' the treatment for asthmatic patients who are well controlled.

Asthma: stepping down treatment

The British Thoracic Society (BTS) guidelines recommend that we should consider stepping down treatment every 3 months or so. The guidelines don't advocate a strict move from say step 3 to step 2 but advise us to take into account duration of treatment, side-effects and patient preference.

When reducing the dose of inhaled steroids the BTS advise us to do this by 25-50% at a time.

Clearly patients with stable asthma may only have a formal review on an annual basis but it is likely that if a patient has recently had an escalation of asthma treatment they would be reviewed on a more frequent basis.

Question 56 of 110

Next

A 48-year-old salesman presents with a 5 day history of cough and pleuritic chest pain. He has no past medical history of note. On examination his temperature is 38.2°C, blood pressure is 120/80 mmHg, respiratory rate 18/min and pulse 84/min. Auscultation of the chest reveals bronchial breathing in the left base and the same area is dull to percussion. What is the most suitable management?



- | | |
|----------------------------------|------------------------------------|
| <input checked="" type="radio"/> | A. Oral amoxicillin |
| <input type="radio"/> | B. Oral co-amoxiclav |
| <input type="radio"/> | C. Oral amoxicillin + erythromycin |
| <input type="radio"/> | D. Oral erythromycin |
| <input type="radio"/> | E. Admit |

Pneumonia: community-acquired

Community acquired pneumonia (CAP) may be caused by the following infectious agents:

- *Streptococcus pneumoniae* (accounts for around 80% of cases)
- *Haemophilus influenzae*
- *Staphylococcus aureus*: commonly after the 'flu
- atypical pneumonias (e.g. Due to *Mycoplasma pneumoniae*)
- viruses

Klebsiella pneumoniae is classically in alcoholics

***Streptococcus pneumoniae* (pneumococcus)** is the most common cause of community-acquired pneumonia

Characteristic features of pneumococcal pneumonia

- rapid onset
- high fever
- pleuritic chest pain
- herpes labialis

Management

CURB-65 criteria of severe pneumonia

- Confusion (abbreviated mental test score $\leq 8/10$)
- Urea > 7 mmol/L
- Respiratory rate ≥ 30 / min
- BP: systolic ≤ 90 or diastolic ≤ 60 mmHg
- age ≥ 65 years

Patients with 3 or more (out of 5) of the above criteria are regarded as having a severe pneumonia

The British Thoracic Society published guidelines in 2009:

- low or moderate severity CAP: oral amoxicillin. A macrolide should be added for patients admitted to hospital
- high severity CAP: intravenous co-amoxiclav + clarithromycin OR cefuroxime + clarithromycin OR cefotaxime + clarithromycin
- the current BNF has slightly different recommendations for high severity CAP: intravenous benzylpenicillin + clarithromycin OR benzylpenicillin + doxycycline. For 'life-threatening' infections the BNF recommends the same as the BTS guidelines for high-severity CAP

Question 57 of 110

Next

A 33-year-old man is seen in the asthma clinic. He was referred with poorly control asthma and has recently had salmeterol added in addition to beclometasone dipropionate inhaler 200mcg bd and salbutamol prn. There has unfortunately been no response to adding the salmeterol. What is the most appropriate action?

- ☐ A. Stop salmeterol + trial of leukotriene receptor antagonist
- ☐ B. Continue salmeterol + increase beclometasone dipropionate inhaler to 400mcg bd
- ☐ C. Continue salmeterol + trial of leukotriene receptor antagonist
- ☐ D. Stop salmeterol + trial of oral theophylline
- ☒ E. Stop salmeterol + increase beclometasone dipropionate inhaler to 400mcg bd

Next question

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
------	------------

Step 1	Inhaled short-acting B2 agonist as required
Step 2	<p>Add inhaled steroid at 200-800 mcg/day*</p> <p>400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease</p>
Step 3	<p>1. Add inhaled long-acting B2 agonist (LABA)</p> <p>2. Assess control of asthma:</p> <ul style="list-style-type: none"> • good response to LABA - continue LABA • benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose) • no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
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Step 5	<p>Use daily steroid tablet in lowest dose providing adequate control. Consider other treatments to minimise the use of steroid tablets</p> <p>Maintain high dose inhaled steroid at 2000 mcg/day*</p> <p>Refer patient for specialist care</p>

*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast

- have both anti-inflammatory and bronchodilatory properties
- should be used when patients are poorly controlled on high-dose inhaled corticosteroids and a long-acting b2-agonist
- particularly useful in aspirin-induced asthma
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Question 58 of 110

Next

A 72-year-old woman is investigated for shortness of breath. Auscultation of the lungs reveals fine bibasal crackles. Which one of the following set of results would be most consistent with a diagnosis of pulmonary fibrosis?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. FEV1 - reduced, FEV1/FVC - reduced |
| <input type="radio"/> | B. FEV1 - increased, FEV1/FVC - reduced |
| <input type="radio"/> | C. FVC - increased, FEV1/FVC - increased |
| <input type="radio"/> | D. FEV1 - normal, FEV1/FVC - reduced |
| <input checked="" type="radio"/> | E. FVC - reduced, FEV1/FVC - normal |

Next question

Pulmonary function tests

Pulmonary function tests can be used to determine whether a respiratory disease is obstructive or restrictive. The table below summarises the main findings and gives some example conditions:

Obstructive lung disease	Restrictive lung disease
FEV1 - significantly reduced FVC - reduced or normal FEV1% (FEV1/FVC) - reduced	FEV1 - reduced FVC - significantly reduced FEV1% (FEV1/FVC) - normal or increased
Asthma COPD Bronchiectasis Bronchiolitis obliterans	Pulmonary fibrosis Asbestosis Sarcoidosis Acute respiratory distress syndrome Infant respiratory distress syndrome Kyphoscoliosis Neuromuscular disorders

Question 59 of 110

Next

One of your patients with difficult to control asthma has been started on omalizumab by the respiratory clinic.

Which one of the following statements regarding omalizumab is correct?

- ☐ A. It causes weight gain in around 10% of patients
- ☐ B. It is given as an intravenous infusion every 2 months
- ☒ C. It can be used in patients aged 6 years and older
- ☐ D. Leukotriene receptor antagonists and oral theophyllines should be stopped once omalizumab is commenced
- ☐ E. It is classed as an ultra-long acting bronchodilator

Omalizumab is given as a subcutaneous injection every 2 to 4 weeks. It is licensed for patients aged 6 years and older

Omalizumab

Omalizumab is a new drug that is available for the management of severe asthma. As its name suggests it's a monoclonal antibody that specifically binds to free human immunoglobulin E (IgE).

Omalizumab is given as a subcutaneous injection every 2 to 4 weeks.

Where does omalizumab fit into current management?

NICE updated their technology appraisal of omalizumab in 2013. A copy of the criteria is given below. The emphasis in bold has been added.

*Omalizumab is recommended as an option for treating **severe persistent confirmed allergic IgE-mediated asthma** as an **add on to optimised standard therapy** in people **aged 6 years and older**:*

- *who need continuous or frequent treatment with **oral corticosteroids (defined as 4 or more courses in the previous year)***

Optimised standard therapy is defined as a full trial of and, if tolerated, documented compliance with inhaled high-dose corticosteroids, long-acting beta agonists, leukotriene receptor antagonists, theophyllines, oral corticosteroids, and smoking cessation if clinically appropriate.

Adverse effects

- abdominal pain
- headache
- fever
- Churg-Strauss syndrome: may present with eosinophilia, vasculitic rash, worsening respiratory symptoms and peripheral neuropathy

Question 60 of 110

Next

You review a 26-year-old woman. She has a history of asthma and is prescribed salbutamol 100mcg 2 puffs prn, beclometasone dipropionate 400mcg bd and salmeterol 50mcg bd. Last week she found out she was pregnant and stopped the beclometasone and salmeterol inhalers as she was concerned about potential harm to the pregnancy. What is the most appropriate action?

- ☐ A. Reduce beclometasone to 200mcg bd and continue salmeterol at the same dose
- ☐ B. Stop beclometasone and salmeterol inhalers + refer to a respiratory physician
- ☐ C. Reduce beclometasone to 200mcg bd and stop salmeterol
- ☐ D. Restart beclomethasone at same dose and stop salmeterol
- ☒ E. Reassure + restart beclometasone and salmeterol inhalers

Next question

Both the BNF and British Thoracic Society guidelines stress the need for good control of asthma during pregnancy. The BNF advises that 'inhaled drugs, theophylline and prednisolone can be taken as normal during pregnancy and breast-feeding'.

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
Step 1	Inhaled short-acting B2 agonist as required
Step 2	Add inhaled steroid at 200-800 mcg/day* 400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease
Step 3	1. Add inhaled long-acting B2 agonist (LABA) 2. Assess control of asthma:

	<ul style="list-style-type: none"> • good response to LABA - continue LABA • benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose) • no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/ day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
Step 4	<p>Consider trials of:</p> <ul style="list-style-type: none"> • increasing inhaled steroid up to 2000 mcg/day* • addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet • the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
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Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
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Question 61-63 of 110

Next

Theme: Asthma: stepwise management in adults

- A. Add inhaled steroid at 400 mcg/day
- B. Increase inhaled steroid to 800 mcg/day
- C. Increase inhaled steroid to 2000 mcg/day
- D. Course of prednisolone for 5 days
- E. Double inhaled steroids until symptoms resolve
- F. Add inhaled long-acting B2 agonist
- G. Trial of leukotriene receptor antagonist
- H. Refer to specialist
- I. Admit to hospital

For each of the following scenarios select the most appropriate action:

61. A 30-year-old man who has asthma presents with a 5 day history of cough and wheeze. He currently takes salbutamol prn and beclometasone 200mcg bd. His peak flow is 70% of normal

The correct answer is Course of prednisolone for 5 days

The BTS guidelines advise doctors to 'Give steroids in adequate doses in all cases of acute asthma.'

62. A 45-year-old man with a five year history of asthma comes for review. He currently uses salbutamol prn and a combined beclometasone + salmeterol inhaler regularly. He mentions that he never gets symptoms at the weekend or whilst on holiday

The correct answer is Refer to specialist

This may be occupational asthma. He should be asked to complete a peak flow diary and referred to a specialist as per BTS guidelines.

- 63.** A 23-year-old woman comes for review. Despite using beclometasone 200mcg bd she is regularly having to use her salbutamol inhaler. Her inhaler technique is good.

The correct answer is Add inhaled long-acting B2 agonist

[Next question](#)

Asthma: stepwise management in adults

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Step 4	<p>Consider trials of:</p> <ul style="list-style-type: none"> • increasing inhaled steroid up to 2000 mcg/day* • addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet • the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
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Additional notes

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Question 64 of 110

Next

A newborn female baby is diagnosed with cystic fibrosis following an episode of meconium ileus shortly after birth. Which one of the following is least likely to occur as a consequence of her underlying diagnosis?

- ☐ A. Delayed puberty
- ☐ B. Nasal polyps
- ☐ C. Diabetes mellitus
- ☐ D. Rectal prolapse
- ☒ E. Arthropathy

Next question

Arthropathy is not a common feature of cystic fibrosis

Cystic fibrosis: features**Presenting features**

- neonatal period (around 20%): meconium ileus, less commonly prolonged jaundice
- recurrent chest infections (40%)
- malabsorption (30%): steatorrhoea, failure to thrive
- other features (10%): liver disease

Other features of cystic fibrosis

- short stature
- diabetes mellitus
- delayed puberty
- rectal prolapse (due to bulky stools)
- nasal polyps
- male infertility, female subfertility

Question 65 of 110

Next

Which one of the following statements regarding the use of long-term oxygen (LTOT) therapy in patients with chronic obstructive pulmonary disease (COPD) is correct?

- ☐ A. All patients with severe COPD (FEV1 30-49% predicted) should be offered LTOT
- ☐ B. LTOT is associated with a slight increase in mortality but a decrease in morbidity
- ☐ C. Smoking is an absolute contraindication
- ☐ D. Oxygen cylinders should be used to provide LTOT
- ☒ E. Patients receiving LTOT should breathe supplemental oxygen for at least 15 hours a day

Next question

Interestingly, NICE do not view smoking as an absolute contraindication to LTOT, despite the obvious safety issues. It states 'If they smoke, warn them about the risk of fire and explosion'.

COPD: long-term oxygen therapy

The 2010 NICE guidelines on COPD clearly define which patients should be assessed for and offered long-term oxygen therapy (LTOT). Patients who receive LTOT should breathe supplementary oxygen for at least 15 hours a day. Oxygen concentrators are used to provide a fixed supply for LTOT.

Assess patients if any of the following:

- very severe airflow obstruction (FEV1 < 30% predicted). Assessment should be 'considered' for patients with severe airflow obstruction (FEV1 30-49% predicted)
- cyanosis
- polycythaemia
- peripheral oedema
- raised jugular venous pressure

- oxygen saturations less than or equal to 92% on room air

Assessment is done by measuring arterial blood gases on 2 occasions at least 3 weeks apart in patients with stable COPD on optimal management.

Offer LTOT to patients with a pO₂ of < 7.3 kPa or to those with a pO₂ of 7.3 - 8 kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

Question 66 of 110

Next

A 61-year-old female is reviewed in the rheumatology clinic with increasing shortness of breath. She has been on long-term drug therapy to control her rheumatoid arthritis. Her oxygen saturations on room air are on 89%. Investigations reveal the following:

Chest x-ray	Bilateral interstitial shadowing
-------------	----------------------------------

Which drug is most likely to be responsible for her symptoms?

- | | |
|----------------------------------|-----------------------|
| <input type="radio"/> | A. Infliximab |
| <input type="radio"/> | B. Hydroxychloroquine |
| <input type="radio"/> | C. Sulphasalazine |
| <input type="radio"/> | D. Azathioprine |
| <input checked="" type="radio"/> | E. Methotrexate |

Next question

Rheumatoid arthritis: respiratory manifestations

A variety of respiratory problems may be seen in patients with rheumatoid arthritis:

- pulmonary fibrosis
- pleural effusion
- pulmonary nodules
- bronchiolitis obliterans
- complications of drug therapy e.g. methotrexate pneumonitis
- pleurisy
- Caplan's syndrome - massive fibrotic nodules with occupational coal dust exposure
- infection (possibly atypical) secondary to immunosuppression

Question 67 of 110

Next

A 29-year-old woman with a history of asthma presents for review. She has recently been discharged from hospital following an acute exacerbation and reports generally poor control with a persistent night time cough and exertional wheeze.

Her current asthma therapy is:

- salbutamol inhaler 100mcg prn
- Clenil (beclometasone dipropionate) inhaler 800mcg bd
- salmeterol 50mcg bd

She has a history of missing appointments and requests a medication with as few side-effects as possible. What is the most appropriate next step in management?

- | | |
|----------------------------------|------------------------------------|
| <input type="radio"/> | A. Tiotropium inhaler |
| <input type="radio"/> | B. Low-dose prednisolone |
| <input checked="" type="radio"/> | C. Leukotriene receptor antagonist |

☐ D. Modified-release theophylline

☐ E. Omalizumab

[Next question](#)

This lady is on step 4 of asthma management. The British Thoracic Society (BTS) recommend one of 4 options:

- increasing inhaled steroid up to 2000 mcg/day
- leukotriene receptor antagonist
- theophylline
- B2 agonist tablet

The BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines. Given this ladies history of poor attendance and request for a tablet with the fewest side-effects it seems reasonable to give her a trial of a leukotriene receptor antagonist.

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
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Step	Management
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Additional notes

Leukotriene receptor antagonists

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Question 68 of 110

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- | | |
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| <input checked="" type="radio"/> | C. Leukotriene receptor antagonist |
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| <input type="radio"/> | E. Omalizumab |

Next question

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Question 69-71 of 110

Next

Theme: Respiratory tract infections: NICE guidelines

A. 2 days

B. 4 days

- C. 7 days
- D. 10 days
- E. 2 1/2 weeks
- F. 4 weeks
- G. 5 weeks

For each one of the following respiratory tract infections select the average total illness length:

69. Acute tonsillitis

The correct answer is 7 days

70. Acute rhinosinusitis

✓ 2 1/2 weeks

71. Common cold

The correct answer is 10 days

[Next question](#)

Respiratory tract infections: NICE guidelines

NICE issued guidance in 2008 on the management of respiratory tract infection, focusing on the prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

A no antibiotic prescribing or delayed antibiotic prescribing approach is generally recommended for patients with acute otitis media, acute sore throat/acute pharyngitis/acute tonsillitis, common cold, acute rhinosinusitis or acute cough/acute bronchitis.

However, an immediate antibiotic prescribing approach may be considered for:

- children younger than 2 years with bilateral acute otitis media
- children with otorrhoea who have acute otitis media
- patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present

The Centor criteria* are as follows:

- presence of tonsillar exudate
- tender anterior cervical lymphadenopathy or lymphadenitis
- history of fever
- absence of cough

If the patient is deemed at risk of developing complications, an immediate antibiotic prescribing policy is recommended

- are systemically very unwell
- have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications)
- are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely
- are older than 65 years with acute cough and two or more of the following, or older than 80 years with acute cough and one or more of the following:
 - - hospitalisation in previous year
 - - type 1 or type 2 diabetes
 - - history of congestive heart failure
 - - current use of oral glucocorticoids

The guidelines also suggest that patients should be advised how long respiratory tract infections may last:

- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1 1/2 weeks

- acute rhinosinusitis: 2 1/2 weeks
- acute cough/acute bronchitis: 3 weeks

*if 3 or more of the criteria are present there is a 40-60% chance the sore throat is caused by Group A beta-haemolytic *Streptococcus*

Question 72 of 110

Next

You review a 67-year-old man who has chronic obstructive pulmonary disease (COPD). On examination there is evidence of cor pulmonale with a significant degree of pedal oedema. His FEV1 is 43%. During a recent hospital stay his pO2 on room air was 7.5 kPa. Which one of the following interventions is most likely to increase survival in this patient?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. Inhaled corticosteroid |
| <input type="radio"/> | B. Heart-lung transplant |
| <input type="radio"/> | C. Pulmonary rehabilitation |
| <input type="radio"/> | D. Loop diuretic therapy |
| <input checked="" type="radio"/> | E. Long-term oxygen therapy |

Next question

After smoking cessation, long-term oxygen therapy (LTOT) is one of the few interventions that has been shown to improve survival in COPD.

LTOT should be offered to patients with a pO2 of < 7.3 kPa or to those with a pO2 of 7.3 - 8 kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

COPD: stable management

NICE updated its guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy

- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 73 of 110

Next

A 58-year-old man is investigated for a chronic cough and is found to have lung cancer. He enquires whether it may be work related. Which one of the following is most likely to increase his risk of developing lung cancer?

- | | |
|----------------------------------|-------------------------|
| <input type="radio"/> | A. Isocyanates |
| <input type="radio"/> | B. Soldering flux resin |
| <input checked="" type="radio"/> | C. Passive smoking |
| <input type="radio"/> | D. Coal dust |



E. Polyvinyl chloride

[Next question](#)

Whilst many chemicals have been implicated in the development of lung cancer passive smoking is the most likely cause. Up to 15% of lung cancers in patients who do not smoke are thought to be caused by passive smoking

Lung cancer: risk factors

Smoking

- increases risk of lung ca by a factor of 10

Other factors

- asbestos - increases risk of lung ca by a factor of 5
- arsenic
- radon
- nickel
- chromate
- aromatic hydrocarbon
- cryptogenic fibrosing alveolitis

Factors that are NOT related

- coal dust

Smoking and asbestos are synergistic, i.e. a smoker with asbestos exposure has a $10 * 5 = 50$ times increased risk

Question 74 of 110

[Next](#)

A 40-year-old man is investigated for increasing shortness of breath. He has smoked for the past 25 years. Pulmonary function tests are performed and are reported as follows:

FEV1	1.4 L (predicted 3.8 L)
FVC	1.7 L (predicted 4.5 L)
FEV1/FVC	82% (normal > 75%)

Which one of the following disorders is most consistent with these results?

- ☐ A. Asthma
- ☐ B. Bronchiectasis
- ☒ C. Neuromuscular disorder
- ☐ D. Chronic obstructive pulmonary disease
- ☐ E. Laryngeal malignancy

Next question

These results show a restrictive picture, which may result from a number of conditions including a neuromuscular disorder. The other answers cause an obstructive picture.

Pulmonary function tests


Pulmonary function tests can be used to determine whether a respiratory disease is obstructive or restrictive. The table below summarises the main findings and gives some example conditions:

Obstructive lung disease	Restrictive lung disease
FEV1 - significantly reduced FVC - reduced or normal FEV1% (FEV1/FVC) - reduced	FEV1 - reduced FVC - significantly reduced FEV1% (FEV1/FVC) - normal or increased
Asthma COPD Bronchiectasis Bronchiolitis obliterans	Pulmonary fibrosis Asbestosis Sarcoidosis Acute respiratory distress syndrome Infant respiratory distress syndrome Kyphoscoliosis Neuromuscular disorders

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Next

A 57-year-old female presents after being discharged from the acute medical unit two weeks ago, following an admission with shortness of breath and pleuritic chest pain. During her admission a pulmonary embolism was diagnosed and warfarin commenced. She has no past medical history of note and enjoys good health. What is the recommended length of warfarinisation for this patient?

- ☐ A. 6 weeks
- ☐ B. 3 months
-  ☒ C. 6 months
- ☐ D. 12 months
- ☐ E. Life-long

Next question

There are no transient risk factors for venous thromboembolism therefore the patient should be anticoagulated for 6 months.

Recent NICE guidelines advise to 'offer a VKA* beyond 3 months to patients with an unprovoked PE'.

*vitamin K antagonists, i.e. warfarin

Pulmonary embolism: management

The NICE guidelines of 2012 provided some clarity on how long patients should be anticoagulated for after a pulmonary embolism (PE). Selected points are listed below.

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a PE is diagnosed. An exception to this is for patients with a massive PE where thrombolysis is being considered. In such a situation unfractionated heparin should be used.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis

- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE advise extending warfarin beyond 3 months for patients with *unprovoked* PE. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months
- for patients with active cancer NICE recommend using LMWH for 6 months

Thrombolysis

- thrombolysis is now recommended as the first-line treatment for massive PE where there is circulatory failure (e.g. hypotension). Other invasive approaches should be considered where appropriate facilities exist

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Next

You are performing an audit of your patients who have chronic severe asthma. Which one of the following statements regarding chronic severe asthma is correct?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Around 1% of asthma patients in the UK are classed as having chronic severe asthma |
| <input type="radio"/> | B. It is more common in men |
| <input type="radio"/> | C. Around 20% of patients have underlying Churg-Strauss syndrome |
| <input checked="" type="radio"/> | D. Patients with chronic severe asthma are less likely to suffer from other atopic conditions |
| <input type="radio"/> | E. It can be managed solely by primary care |

Next question

Chronic severe asthma is more common in women and less associated with atopy than mild-

moderate asthma.

Secondary care input is required given that by definition it responds poorly to standard treatment.

Chronic severe asthma

There is no universally accepted definition for what constitutes chronic severe asthma. It is generally used to describe patients who remain symptomatic despite compliance with high doses of either inhaled or oral corticosteroids. Many patients will have had severe exacerbations in the past requiring admission and possibly intensive care input.

In the UK around 5-10% of asthma patients have chronic severe asthma. Interestingly it is significantly more common in women. There is also less of an association with other atopic diseases than patients with mild-moderate asthma.

Overtime patients with chronic severe asthma may become less responsive to oral or inhaled corticosteroids. This is thought to occur due to down-regulation of glucocorticoid receptors.

The first step is usually to ensure that the patient is compliant with the current treatment and has a good inhaler technique. A course of oral prednisolone is often given - patients who see a marked improvement in symptoms may not be compliant with high-dose inhaled corticosteroids.

Such patients are classified as step 4 and 5 on the British Thoracic Society (BTS) treatment pathway. As such they should be managed with the input of an asthma specialist.

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Next

Following the 2014 National Review of Asthma Deaths, what is the minimum number of salbutamol prescriptions in the past 12 months that should prompt an urgent review of a patient's asthma control?

- ☐ A. 4
- ☐ B. 8
- ☒ C. 12

☐ D. 16

☐ E. 20

Next question

The Royal College of Physicians make the following recommendation in the report:

All asthma patients who have been prescribed more than 12 short-acting reliever inhalers in the previous 12 months should be invited for urgent review of their asthma control, with the aim of improving their asthma through education and change of treatment if required

Asthma: National Review of Asthma Deaths

In 2014 the Royal College of Physicians (RCP) published a review, 'Why asthma still kills: The National Review of Asthma Deaths (NRAD)', which received widespread media coverage. This detailed review looked at 195 asthma deaths which occurred over a 12 month period. Much of this media focus was angled at poor GP management of patients with asthma. The following is a selected set of findings and recommendations. Please see the full report for a complete list - a link is provided.

Key findings of the report included:

- personal asthma action plans, acknowledged to improve asthma care, were known to be provided to only 44 (23%) of the 195 people who died from asthma
- there was no evidence that an asthma review had taken place in general practice in the last year before death for 84 (43%) of the 195 people who died
- the expert panels identified factors that could have avoided death in relation to the health professionals implementation of asthma guidelines in 89 (46%) of the 195 deaths, including lack of specific asthma expertise in 34 (17%) and lack of knowledge of the UK asthma guidelines in 48 (25%)
- inappropriate prescribing of long-acting beta agonist (LABA) bronchodilator inhalers. 27 (14%) of those who died were prescribed a single-component LABA bronchodilator at the time of death. At least five (3%) patients were on LABA monotherapy without inhaled corticosteroid preventer treatment

Selected recommendations include:

- referral to secondary care should be made if patients have required more than two courses of systemic corticosteroids, oral or injected, in the previous 12 months or require management using British Thoracic Society (BTS) stepwise treatment 4 or 5 to achieve control
- all patients who have been prescribed more than 12 reliever inhalers in the past 12 months should be invited for urgent review of their asthma control
- an assessment of inhaler technique should be routinely undertaken and formally documented at annual review
- non-adherence to inhaled corticosteroids is associated with increased risk of poor asthma control and should be continually monitored
- the use of combination inhalers should be encouraged. Where long-acting beta agonist (LABA) bronchodilators are prescribed for people with asthma, they should be prescribed with an inhaled corticosteroid in a single combination inhaler

Question 78 of 110


Next

A 21-year-old man comes for review. Over the past six months he has experienced a night-time cough and a 'tight-chest' when he tries to exercise. He has a history of hayfever and eczema and is a non-smoker.

His symptoms have got progressively and now occur on a daily basis. He is also woken around twice a week due to his breathing.

Spirometry shows FEV1/FVC of 0.65 with a FEV1 72% of predicted.

What is the most appropriate course of action?

- | | | |
|---|----------------------------------|--|
|  | <input checked="" type="radio"/> | A. Trial of a salbutamol inhaler + a corticosteroid inhaler |
| | <input type="radio"/> | B. Refer to the respiratory clinic |
| | <input type="radio"/> | C. Trial of a salbutamol inhaler |
| | <input type="radio"/> | D. Ask him to keep a diary of peak flow readings |
| | <input type="radio"/> | E. Arrange a chest x-ray |

This patient has a 'high' probability of asthma so treatment should be started. However, he is having daily symptoms so it is appropriate to start him at step 2.

Asthma: diagnosis in adults

Whilst the diagnosis of asthma remains largely clinical, the British Thoracic Society (BTS) guidelines do offer some guidance on how we should approach this problem, for both adults and children. They recommend we classify patients as having either a high, intermediate or low probability of asthma based on the presence or absence of certain symptoms:

For adults it is recommended that they have a **clinical assessment including spirometry** (or Peak Expiratory Flow measurement if spirometry is not available):

When assessing patients we should therefore look for symptoms which may support a diagnosis of asthma, and those which may point to an alternative diagnosis. The BTS produced a list of features which are helpful when deciding this:

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:</p> <ul style="list-style-type: none"> • symptoms worse at night and in the early morning • symptoms in response to exercise, allergen exposure and cold air • symptoms after taking aspirin or beta blockers <p>History of atopic disorder</p> <p>Family history of asthma and/or atopic disorder</p> <p>Widespread wheeze heard on auscultation of the chest</p> <p>Otherwise unexplained low FEV1 or PEF (historical or serial readings)</p> <p>Otherwise unexplained peripheral blood eosinophilia</p>	<p>Prominent dizziness, light-headedness, peripheral tingling</p> <p>Chronic productive cough in the absence of wheeze or breathlessness</p> <p>Repeatedly normal physical examination of chest when symptomatic</p> <p>Voice disturbance</p> <p>Symptoms with colds only</p> <p>Significant smoking history (ie > 20 pack-years)</p> <p>Cardiac disease</p> <p>Normal PEF or spirometry when symptomatic</p>

If a patient has many symptoms which make a diagnosis of asthma more likely (i.e. a **high probability**) then the BTS recommend that we start a trial of treatment. A good response is considered a positive 'test of reversibility'. If a patient has a poor response to treatment then further investigations should be considered.

What is the most appropriate initial treatment?

The BTS state the following:

Patients should start treatment at the step most appropriate to the initial severity of their asthma

This means that for some patients prescribing a corticosteroid inhaler in addition to a salbutamol inhaler is appropriate. The BTS suggest the following patients would benefit from a corticosteroid inhaler:

Inhaled steroids should be considered for patients with any of the following asthma-related features:

- *exacerbations of asthma in the last two years*
- *using inhaled β_2 agonists three times a week or more*
- *symptomatic three times a week or more*
- *waking one night a week*

The last two points are probably the most relevant to newly diagnosed patients.

For patients with a **low probability** of asthma then an alternative diagnosis should be sought. Further investigations and referral to a respiratory specialist should be considered.

If a patient has an **intermediate probability** of asthma the BTS recommend '*to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a diagnosis and establishing maintenance treatment.*'. The accompanying algorithm suggests this decision should be partly guided by the FEV₁/FVC ratio - a ratio of < 0.7 is suggestive of asthma.

It should of course be noted that spirometry may be normal in asymptomatic patients so it may be necessary to repeat spirometry or peak flow readings on a number of occasions in patients where the diagnosis is not clear.

Recent studies have shown the limited value of other 'objective' tests. It is now recognised that in patients with normal or near-normal pre-treatment lung function there is little room for measurable

improvement in FEV1 or peak flow.

A > 400 ml improvement in FEV1 is considered significant

- before and after 400 mcg inhaled salbutamol in patients with diagnostic uncertainty and airflow obstruction present at the time of assessment
- if there is an incomplete response to inhaled salbutamol, after either inhaled corticosteroids (200 mcg twice daily beclometasone equivalent for 6-8 weeks) or oral prednisolone (30 mg once daily for 14 days)

It is now advised to interpret peak flow variability with caution due to the poor sensitivity of the test

- diurnal variation % = $[(\text{Highest} - \text{Lowest PEFr}) / \text{Highest PEFr}] \times 100$
- assessment should be made over 2 weeks
- greater than 20% diurnal variation is considered significant

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Next

The mother of a 10-year-old boy who has asthma asks for advice. She wants to know if he should have the annual influenza vaccine. His asthma is currently well controlled on a combination of salbutamol, beclometasone and salmeterol. He has had no courses of oral steroids in the past 12 months. What is the most appropriate advice?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. He should have two influenza vaccinations spaced 4-6 weeks apart |
| <input type="radio"/> | B. He does not need the vaccine |
| <input type="radio"/> | C. He should have the vaccine at least once every 5 years |
| <input type="radio"/> | D. If he has had the influenza vaccine before he does not need it again |
| <input checked="" type="radio"/> | E. He should have one influenza vaccination |

Next question

As he uses an inhaled corticosteroid he should be offered the vaccine. Only children aged 2-9 years who have not received influenza vaccine before should receive a second dose of vaccine at least 4 weeks later.

Influenza vaccination

Seasonal influenza still accounts for a significant morbidity and mortality in the UK each winter, with the influenza season typically starting in the middle of November. This may vary year from year so it is recommended that vaccination occurs between September and early November. There are three types of influenza virus; A, B and C. Types A and B account for the majority of clinical disease.

Prior to 2013 flu vaccination was only offered to the elderly and at risk groups.

Remember that the type of vaccine given routinely to children and the one given to the elderly and at risk groups is different (live vs. inactivated) - this explains the different contraindications

Children

A new NHS influenza vaccination programme for children was announced in 2013. There are three key things to remember about the children's vaccine:

- it is given **intranasally**
- the first dose is given at **2-3 years**, then **annually** after that
- it is a **live vaccine** (cf. injectable vaccine below)

Some other points

- children who were traditionally offered the flu vaccine (e.g. asthmatics) will now be given intranasal vaccine unless this is inappropriate, for example if they are immunosuppressed. In this situation the inactivated, injectable vaccine should be given
- only children aged 2-9 years who have not received an influenza vaccine before need 2 doses
- it is more effective than the injectable vaccine

Contraindications

- immunocompromised
- aged < 2 years
- current febrile illness or blocked nose/rhinorrhoea
- current wheeze (e.g. ongoing viral-induced wheeze/asthma) or history of severe asthma (BTS step 4)
- egg allergy
- pregnancy/breastfeeding

- if the child is taking aspirin (e.g. for Kawasaki disease) due to a risk of Reye's syndrome

Side-effects

- blocked-nose/rhinorrhoea
- headache
- anorexia

Adults and at-risk groups

Current vaccines are trivalent and consist of two subtypes of influenza A and one subtype of influenza B.

The Department of Health recommends annual influenza vaccination for people older than 65 years and those older than 6 months if they have:

- chronic respiratory disease (including asthmatics who use inhaled steroids)
- chronic heart disease (heart failure, ischaemic heart disease, including hypertension if associated with cardiac complications)
- chronic kidney disease
- chronic liver disease: cirrhosis, biliary atresia, chronic hepatitis
- chronic neurological disease: (e.g. Stroke/TIAs)
- diabetes mellitus (including diet controlled)
- immunosuppression due to disease or treatment (e.g. HIV)
- asplenia or splenic dysfunction
- pregnant women

Other at risk individuals include:

- health and social care staff directly involved in patient care (e.g. NHS staff)
- those living in long-stay residential care homes
- carers of the elderly or disabled person whose welfare may be at risk if the carer becomes ill (at the GP's discretion)

The influenza vaccine

- it is an inactivated vaccine, so cannot cause influenza. A minority of patients however develop fever and malaise which may last 1-2 days

- should be stored between +2 and +8°C and shielded from light
- contraindications include hypersensitivity to egg protein.
- in adults the vaccination is around 75% effective, although this figure decreases in the elderly
- it takes around 10-14 days after immunisation before antibody levels are at protective levels

Question 80-82 of 110

Next

Theme: Shortness of breath

- | | |
|-----------|---------------------------------------|
| A. | Heart failure |
| B. | Recurrent pulmonary emboli |
| C. | Lung cancer |
| D. | Obesity |
| E. | Pulmonary fibrosis |
| F. | Anaemia |
| G. | Asthma |
| H. | Chronic obstructive pulmonary disease |
| I. | Bronchiectasis |
| J. | Aortic stenosis |

For each one of the following scenarios please select the most likely diagnosis:

- 80.** A 42-year-old smoker presents with chronic cough and shortness of breath. He describes bringing up copious amounts of sputum each morning. Chest x-ray shows numerous parallel line shadows.

The correct answer is Bronchiectasis

Parallel line shadows (often called tram-lines) are common in bronchiectasis and indicate dilated bronchi due to peribronchial inflammation and fibrosis.

81. A 71-year-old man who is being investigated for recurrent collapse presents with progressive shortness of breath. His pulse is 84 / min and blood pressure 110/90 mmHg.

The correct answer is Aortic stenosis

82. A 73-year-old man presents with shortness of breath. He smokes 20 / day but is otherwise well. Spirometry shows a restrictive picture.

The correct answer is Pulmonary fibrosis

[Next question](#)

Shortness of breath: chronic

The table below gives characteristic features for conditions causing chronic shortness of breath (SOB):

Chronic obstructive pulmonary disease	Seen invariably in smokers Chronic productive cough is typical Features of right heart failure may be seen
Heart failure	A history of ischaemic heart disease or hypertension may be present Orthopnoea and paroxysmal nocturnal dyspnoea are characteristic Bibasal crackles and a third heart sound (S3) are the most reliable features of left-sided failure Right heart failure causes peripheral oedema and a raised JVP
Asthma	Cough, wheeze and shortness of breath are typical Symptoms are often worse at night and may be precipitated by cold weather or exercise Associated with hay fever and eczema
Aortic stenosis	Chest pain, SOB and syncope seen in symptomatic patients An ejection systolic murmur radiating to the neck and narrow pulse pressure are found on examination

Recurrent pulmonary emboli	There may be a history of predisposing factors e.g. Malignancy Pleuritic chest pain and haemoptysis may be seen but symptoms are often vague Tachycardia and tachypnoea are common in the acute situation Symptoms of right heart failure may develop in severe cases
Lung cancer	Normally seen in smokers Haemoptysis, chronic cough or unresolving infection are common presentations Systemic symptoms e.g. Weight loss and anorexia
Pulmonary fibrosis	Progressive shortness of breath may be the only symptom Fine bibasal crackles are typical Spirometry shows a restrictive pattern
Bronchiectasis	Affected patients may produce large amounts of purulent sputum Patients may have a history of previous infections (e.g. Tuberculosis, measles), bronchial obstruction or ciliary dyskinetic syndromes e.g. Kartagener's syndrome
Anaemia	There may be a history of gastrointestinal symptoms Pallor may be seen on examination
Obesity	Obese patients tend to be more SOB due to the increased work of activity

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Next

A 29-year-old man is admitted with sudden onset dyspnoea and pleuritic chest pain. He is a smoker but has no history of respiratory disease. He considers himself healthy and regularly plays rugby. On admission he has a chest x-ray that shows a pneumothorax with a 3cm rim of air. Aspiration is successful and he is discharged. A follow-up chest x-ray two weeks later shows a complete resolution. What is the single most important piece of advice to reduce his risk of further pneumothoraces?

- ☐ A. Avoid flying for 12 months
- ☐ B. Avoid contact sports for 12 months
- ☒ C. Stop smoking

- | | |
|-----------------------|--|
| <input type="radio"/> | D. Arrange a course of respiratory physiotherapy |
| <input type="radio"/> | E. Seek prompt medical advice for potential respiratory infections |

Next question

All patients should be advised to avoid smoking to reduce the risk of further episodes - the lifetime risk of developing a pneumothorax in healthy smoking men is around 10% compared with around 0.1% in non-smoking men.

With respect to 'Fitness to fly' rules the CAA suggest patients may travel 2 weeks after successful drainage if there is no residual air. The British Thoracic Society used to recommend not travelling by air for a period of 6 weeks but this has now been changed to 1 week post check x-ray

Pneumothorax

The British Thoracic Society (BTS) published updated guidelines for the management of spontaneous pneumothorax in 2010. A pneumothorax is termed primary if there is no underlying lung disease and secondary if there is

Primary pneumothorax

Recommendations include:

- if the rim of air is < 2cm and the patient is not short of breath then discharge should be considered
- otherwise aspiration should be attempted
- if this fails (defined as > 2 cm or still short of breath) then a chest drain should be inserted
- patients should be advised to avoid smoking to reduce the risk of further episodes - the lifetime risk of developing a pneumothorax in healthy smoking men is around 10% compared with around 0.1% in non-smoking men

Secondary pneumothorax

Recommendations include:

- if the patient is > 50 years old and the rim of air is > 2cm and/or the patient is short of breath then a chest drain should be inserted.
- otherwise aspiration should be attempted if the rim of air is between 1-2cm. If aspiration fails (i.e. pneumothorax is still greater than 1cm) a chest drain should be inserted. All patients should be admitted for at least 24 hours
- if the pneumothorax is less than 1cm then the BTS guidelines suggest giving oxygen and admitting for 24 hours
- regarding scuba diving, the BTS guidelines state: *'Diving should be permanently avoided unless the patient has undergone bilateral surgical pleurectomy and has normal lung function and chest CT scan postoperatively.'*

Iatrogenic pneumothorax

Recommendations include:

- less likelihood of recurrence than spontaneous pneumothorax
- majority will resolve with observation, if treatment is required then aspiration should be used
- ventilated patients need chest drains, as may some patients with COPD

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Next

A 59-year-old woman presents for review. Around six weeks ago she was diagnosed with pneumonia after presenting with a productive cough and flu-like symptoms. She has no history of asthma and gave up smoking around three years ago after being diagnosed with hypertension. A chest x-ray was obtained which was reported as follows:

Consolidation is seen in the left lower zone.
Normal mediastinal outline. No pleural effusion.
Normal heart size

She was treated with a 7 day course of amoxicillin which improved her symptoms. A routine follow-up x-ray is repeated 6 weeks later:

Consolidation has improved but not resolved in the left lower zone
No suspicious lesion seen.
Normal mediastinal outline.

Her cough is now '80% better' and is now non-productive. There is no history of haemoptysis and her weight is stable. What is the most appropriate course of action?

- ☐ A. Repeat the chest x-ray in 6 weeks
- ☐ B. Give a course of clarithromycin
- ☐ C. Give a course of flucoxylacillin + amoxicillin
- ☒ D. Urgent referral to the chest clinic
- ☐ E. Check serum ACE levels

Next question

This lady, who is an ex-smoker, has slowly resolving consolidation and a persistent cough. She should be referred under the 2 week wait rule to exclude lung cancer.

Lung cancer: referral

The 2005 NICE cancer referral guidelines gave the following advice:

Consider immediate referral for patients with:

- signs of superior vena caval obstruction (swelling of the face/neck with fixed elevation of jugular venous pressure)
- stridor

Refer urgently patients with:

- persistent haemoptysis (in smokers or ex-smokers aged 40 years and older)
- a chest X-ray suggestive of lung cancer (including pleural effusion and slowly resolving consolidation)
- a normal chest X-ray where there is a high suspicion of lung cancer
- a history of asbestos exposure and recent onset of chest pain, shortness of breath or unexplained systemic symptoms where a chest x-ray indicates pleural effusion, pleural mass or any suspicious lung pathology

Refer urgently for chest x-ray for patients with any of the following:

- haemoptysis
- unexplained or persistent (longer than 3 weeks): chest and/or shoulder pain, dyspnoea, weight loss, chest signs, hoarseness, finger clubbing, cervical or supraclavicular lymphadenopathy, cough, features suggestive of metastasis from a

lung cancer (for example, secondaries in the brain, bone, liver, skin)

- underlying chronic respiratory problems with unexplained changes in existing symptoms

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Next

You are doing a new patient medical for a 66-year-old man. He has a history of chronic obstructive pulmonary disease (COPD) which was diagnosed 5 years ago. His only current medication is a tiotropium inhaler. Despite good concordance with this medication he remains short-of-breath on minimal exertion. A recent chest x-ray showed no worrying features and his last FEV₁ was 58%. What is the most appropriate next step in management?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Add a long-acting beta2-agonist (LABA) + inhaled corticosteroid (ICS) inhaler |
| <input type="radio"/> | B. Add a short-acting beta2-agonist (SABA) |
| <input type="radio"/> | C. Switch to a long-acting beta2-agonist (LABA) |
| <input type="radio"/> | D. Add a short-acting muscarinic antagonist (SAMA) |
| <input type="radio"/> | E. Add an inhaled corticosteroid (ICS) inhaler |

Next question

If you follow the NICE COPD treatment algorithm it is not uncommon for patients to be only taking a LAMA such as tiotropium as it is recommended to stop the SAMA after commencing a LAMA. The next step for patients on LAMA monotherapy would be to add a long-acting beta2-agonist (LABA) + inhaled corticosteroid (ICS) inhaler, regardless of the FEV₁.

COPD: stable management

NICE updated its guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy

- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 86 of 110

Next

What type of spirometry is recommended by NICE when investigating a patient with suspected chronic obstructive pulmonary disease (COPD)?

- ✓ ☒ A. Post-bronchodilator spirometry
- ☐ B. Spirometry following mild-moderate exertion
- ☐ C. Spirometry after not smoking for 48 hours
- ☐ D. Pre-bronchodilator spirometry
- ☐ E. Spirometry with reversibility

Next question

Please see the NICE guidelines for more details.

COPD: investigation and diagnosis

NICE recommend considering a diagnosis of COPD in patients over 35 years of age who are smokers or ex-smokers and have symptoms such as exertional breathlessness, chronic cough or regular sputum production.

The following investigations are recommended in patients with suspected COPD:

- post-bronchodilator spirometry to demonstrate airflow obstruction: FEV1/FVC ratio less than 70%
- chest x-ray: hyperinflation, bullae, flat hemidiaphragm. Also important to exclude lung cancer
- full blood count: exclude secondary polycythaemia
- body mass index (BMI) calculation

The severity of COPD is categorised using the FEV1*:

Post-bronchodilator FEV1/FVC	FEV1 (of predicted)	Severity
< 0.7	> 80%	Stage 1 - Mild**
< 0.7	50-79%	Stage 2 - Moderate
< 0.7	30-49%	Stage 3 - Severe
< 0.7	< 30%	Stage 4 - Very severe

Measuring peak expiratory flow is of limited value in COPD, as it may underestimate the degree of airflow obstruction.

*note that the grading system has changed following the 2010 NICE guidelines. If the FEV1 is greater than 80% predicted but the post-bronchodilator FEV1/FVC is < 0.7 then this is classified as Stage 1 - mild

**symptoms should be present to diagnose COPD in these patients

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Next

You are reviewing a patient with chronic obstructive pulmonary disease (COPD) who remains breathless despite using a salbutamol inhaler as required. Their FEV1 is 60%. What are the two main options?

- ☐ A. Long-acting beta2-agonist (LABA) **or** inhaled corticosteroid
- ☐ B. Long-acting muscarinic antagonist (LAMA) + inhaled corticosteroid (ICS) in a combination inhaler **or** long-acting beta2-agonist (LABA)
- ☐ C. Long-acting beta2-agonist (LABA) **or** LABA + inhaled corticosteroid (ICS) in a combination inhaler
- ☐ D. Long-acting beta2-agonist (LABA) **or** regular combined short-acting beta2-agonist + muscarinic antagonist (e.g. Combivent)
- ☒ E. Long-acting beta2-agonist (LABA) **or** long-acting muscarinic antagonist (LAMA)

Next question

COPD - still breathless despite using inhalers as required?

- FEV1 > 50%: LABA **or** LAMA
- FEV1 < 50%: LABA + ICS **or** LAMA

COPD: stable management

NICE updated it's guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination

- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 88-90 of 110

Next

Theme: Respiratory pathogens

- | |
|---|
| A. Adenovirus |
| B. Parainfluenza virus |
| C. <i>Mycobacterium tuberculosis</i> |
| D. Pneumocystis jiroveci |
| E. Respiratory syncytial virus |
| F. <i>Mycoplasma pneumoniae</i> |
| G. Rhinovirus |
| H. <i>Legionella pneumophila</i> |
| I. <i>Streptococcus pneumoniae</i> |
| J. <i>Staphylococcus aureus</i> |

For each of the following scenarios please select the most likely causative respiratory pathogen:

- 88.** A 40-year-old man develops pneumonia following an episode of influenza

The correct answer is *Staphylococcus aureus*

89. A 30-year-old woman is admitted with pneumonia to hospital. She has a fever and a dry cough. On examination erythema multiforme is noted and bloods show she has a normocytic anaemia.

The correct answer is *Mycoplasma pneumoniae*

90. There is an outbreak of respiratory tract infections on a cruise ship. Bloods from one passenger show deranged liver function tests and hyponatraemia.

✓ *Legionella pneumophila*

[Next question](#)

Respiratory pathogens

The table below lists the more common respiratory pathogens:


Pathogen	Associated condition
Respiratory syncytial virus	Bronchiolitis
Parainfluenza virus	Croup
Rhinovirus	Common cold
Influenza virus	Flu
<i>Streptococcus pneumoniae</i>	The most common cause of community-acquired pneumonia
<i>Haemophilus influenzae</i>	Community-acquired pneumonia Most common cause of bronchiectasis exacerbations

	Acute epiglottitis
<i>Staphylococcus aureus</i>	Pneumonia, particularly following influenza
<i>Mycoplasma pneumoniae</i>	Atypical pneumonia Flu-like symptoms classically precede a dry cough. Complications include haemolytic anaemia and erythema multiforme
<i>Legionella pneumophila</i>	Atypical pneumonia Classically spread by air-conditioning systems, causes dry cough. Lymphopenia, deranged liver function tests and hyponatraemia may be seen
<i>Pneumocystis jiroveci</i>	Common cause of pneumonia in HIV patients. Typically patients have few chest signs and develop exertional dyspnoea
<i>Mycobacterium tuberculosis</i>	Causes tuberculosis. A wide range of presentations from asymptomatic to disseminated disease are possible. Cough, night sweats and weight loss may be seen

Question 91 of 110

Next

A 38-year-old man is reviewed in the respiratory clinic complaining of episodic wheezing whilst playing rugby. There is no history of cough, atopy or smoking. He is generally fit and well and has no past medical history of note. Clinical examination is unremarkable. Following history and examination it is thought he has an intermediate probability of asthma. Which one of the following is the most appropriate next investigation?

-  ☒ A. Spirometry
- ☐ B. Serial peak expiratory flow measurements
- ☐ C. Histamine stimulation test
- ☐ D. Methacholine stimulation test
- ☐ E. A trial of inhaled steroids with FEV1 measurements before and after

Asthma - intermediate probability - do spirometry first-line

If the $FEV_1/FVC < 0.7$ then a trial of treatment is appropriate. Otherwise further investigations should be performed

Asthma: diagnosis in adults

Whilst the diagnosis of asthma remains largely clinical, the British Thoracic Society (BTS) guidelines do offer some guidance on how we should approach this problem, for both adults and children. They recommend we classify patients as having either a high, intermediate or low probability of asthma based on the presence or absence of certain symptoms:

For adults it is recommend that they have a **clinical assessment including spirometry** (or Peak Expiratory Flow measurement if spirometry is not available):

When assessing patients we should therefore look for symptoms which may support a diagnosis of asthma, and those which may point to an alternative diagnosis. The BTS produced a list of features which are helpful when deciding this:

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:</p> <ul style="list-style-type: none"> • symptoms worse at night and in the early morning • symptoms in response to exercise, allergen exposure and cold air • symptoms after taking aspirin or beta blockers <p>History of atopic disorder</p> <p>Family history of asthma and/or atopic disorder</p> <p>Widespread wheeze heard on auscultation of the chest</p> <p>Otherwise unexplained low FEV1 or PEF (historical or serial readings)</p>	<p>Prominent dizziness, light-headedness, peripheral tingling</p> <p>Chronic productive cough in the absence of wheeze or breathlessness</p> <p>Repeatedly normal physical examination of chest when symptomatic</p> <p>Voice disturbance</p> <p>Symptoms with colds only</p> <p>Significant smoking history (ie > 20 pack-years)</p> <p>Cardiac disease</p>

Otherwise unexplained peripheral blood eosinophilia	Normal PEF or spirometry when symptomatic
---	---

If a patient has many symptoms which make a diagnosis of asthma more likely (i.e. a **high probability**) then the BTS recommend that we start a trial of treatment. A good response is considered a positive 'test of reversibility'. If a patient has a poor response to treatment then further investigations should be considered.

What is the most appropriate initial treatment?

The BTS state the following:

Patients should start treatment at the step most appropriate to the initial severity of their asthma

This means that for some patients prescribing a corticosteroid inhaler in addition to a salbutamol inhaler is appropriate. The BTS suggest the following patients would benefit from a corticosteroid inhaler:

Inhaled steroids should be considered for patients with any of the following asthma-related features:

- *exacerbations of asthma in the last two years*
- *using inhaled β_2 agonists three times a week or more*
- *symptomatic three times a week or more*
- *waking one night a week*

The last two points are probably the most relevant to newly diagnosed patients.

For patients with a **low probability** of asthma then an alternative diagnosis should be sought. Further investigations and referral to a respiratory specialist should be considered.

If a patient has an **intermediate probability** of asthma the BTS recommend 'to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a diagnosis and establishing maintenance treatment. '. The accompanying algorithm suggests this decision should be partly guided by the FEV₁/FVC ratio - a ratio of < 0.7 is suggestive of asthma.

It should of course be noted that spirometry may be normal in asymptomatic patients so it may be necessary to repeat spirometry or peak flow readings on a number of occasions in patients where the diagnosis is not clear.

Recent studies have shown the limited value of other 'objective' tests. It is now recognised that in patients with normal or near-normal pre-treatment lung function there is little room for measurable improvement in FEV1 or peak flow.

A > 400 ml improvement in FEV1 is considered significant

- before and after 400 mcg inhaled salbutamol in patients with diagnostic uncertainty and airflow obstruction present at the time of assessment
- if there is an incomplete response to inhaled salbutamol, after either inhaled corticosteroids (200 mcg twice daily beclometasone equivalent for 6-8 weeks) or oral prednisolone (30 mg once daily for 14 days)

It is now advised to interpret peak flow variability with caution due to the poor sensitivity of the test

- diurnal variation % = $[(\text{Highest} - \text{Lowest PEFr}) / \text{Highest PEFr}] \times 100$
- assessment should be made over 2 weeks
- greater than 20% diurnal variation is considered significant

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Next

What is the carrier rate of cystic fibrosis in the UK?

- | | |
|----------------------------------|-------------|
| <input type="radio"/> | A. 1 in 5 |
| <input type="radio"/> | B. 1 in 10 |
| <input checked="" type="radio"/> | C. 1 in 25 |
| <input type="radio"/> | D. 1 in 100 |
| <input type="radio"/> | E. 1 in 500 |

Next question

Cystic fibrosis

Cystic fibrosis (CF) is an autosomal recessive disorder causing increased viscosity of secretions (e.g. lungs and pancreas). It is due to a defect in the cystic fibrosis transmembrane conductance regulator gene (CFTR), which codes a cAMP-regulated chloride channel

In the UK 80% of CF cases are due to delta F508 on the long arm of chromosome 7. Cystic fibrosis affects 1 per 2500 births, and the carrier rate is c. 1 in 25

Organisms which may colonise CF patients

- *Staphylococcus aureus*
 - *Pseudomonas aeruginosa*
 - *Burkholderia cepacia**
 - *Aspergillus*
- *previously known as *Pseudomonas cepacia*

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Next

A 39-year-old female who has recently emigrated from sub-Saharan Africa is screened for tuberculosis. She reports being fit and well with no past medical history and has never had a BCG vaccination. Her chest x-ray is normal but she has a Mantoux test which is positive. An interferon gamma test is also performed which is positive. A HIV test is requested which is negative. A diagnosis of latent tuberculosis is suspected. Which one of the following treatments is she most likely to be offered?

- ✓ ☒ A. Isoniazid for 6 months
- ☐ B. Rifampicin, isoniazid, pyrazinamide and ethambutol for 6 months
- ☐ C. Observe
- ☐ D. Rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months then step down to rifampicin and isoniazid for 4 months
- ☐ E. Rifampicin and isoniazid for 6 months

Next question

Tuberculosis: drug therapy

The standard therapy for treating **active tuberculosis** is:

Initial phase - first 2 months (RIPE)

- Rifampicin
- Isoniazid
- Pyrazinamide
- Ethambutol (the 2006 NICE guidelines now recommend giving a 'fourth drug' such as ethambutol routinely - previously this was only added if drug-resistant tuberculosis was suspected)

Continuation phase - next 4 months

- Rifampicin
- Isoniazid

The treatment for **latent tuberculosis** is isoniazid alone for 6 months

Patients with **meningeal tuberculosis** are treated for a prolonged period (at least 12 months) with the addition of steroids

Directly observed therapy with a three times a week dosing regimen may be indicated in certain groups, including:

- homeless people with active tuberculosis
- patients who are likely to have poor concordance
- all prisoners with active or latent tuberculosis

Question 94 of 110

Next

With respect to the NICE Chronic Obstructive Pulmonary Disease guidelines (COPD), what criteria should be used to determine whether patients who are having an exacerbation of COPD require antibiotics?

- ☐ A. Those with moderate or severe COPD
- ☐ B. Those who are > 65 years of age or patients with significant comorbidities
- ☒ C. Those with purulent sputum or clinical signs of pneumonia
- ☐ D. All patients
- ☐ E. Those who have had a positive sputum culture

Next question

COPD: management of acute exacerbations

The most common bacterial organisms that cause infective exacerbations of COPD are:

- *Haemophilus influenzae* (most common cause)
- *Streptococcus pneumoniae*
- *Moraxella catarrhalis*

Respiratory viruses account for around 30% of exacerbations, with the human rhinovirus being the most important pathogen.

NICE guidelines from 2010 recommend the following:

- increase frequency of bronchodilator use and consider giving via a nebuliser
- give prednisolone 30 mg daily for 7-14 days
- it is common practice for all patients with an exacerbation of COPD to receive antibiotics. NICE do not support this approach. They recommend giving oral antibiotics 'if sputum is purulent or there are clinical signs of pneumonia'

Question 95 of 110

Next

A 34-year-old steelworker presents complaining of episodic shortness of breath. This is particularly noted whilst at work where he describes feeling wheezy and having a tendency to cough. A diagnosis of occupation asthma is suspected. Which one of the following is the most appropriate diagnostic investigation?

- ☐ A. Patch testing
- ☐ B. High resolution computed tomography of thorax
- ☒ C. Serial peak flow measurements at work and at home
- ☐ D. Specific IgE measurements
- ☐ E. Skin prick test

Next question

Asthma: occupational

Patients may either present with concerns that chemicals at work are worsening their asthma or you may notice in the history that symptoms seem better at weekends / when away from work.

Exposure to the following chemicals is associated with occupational asthma:

- isocyanates - the most common cause. Example occupations include spray painting and foam moulding using adhesives
- platinum salts
- soldering flux resin
- glutaraldehyde
- flour
- epoxy resins
- proteolytic enzymes

Serial measurements of peak expiratory flow are recommended at work and away from work.

Referral should be made to a respiratory specialist for patients with suspected occupational asthma.

Question 96 of 110

Next

A 72-year-old man was admitted to hospital with an exacerbation of his longstanding chronic obstructive airways disease. The patient's regular treatment for COPD included home oxygen, home bronchodilator nebulisers and high-dose inhaled steroids. Normal exercise tolerance was very limited with the patient becoming profoundly breathless after mobilising only short distances around his house. Following an admission to the intensive care unit for respiratory support the previous winter the patient had expressed a wish that he would not want non-invasive ventilation or intubation in the future and stated that control of his symptoms was his priority.

Treatment with prednisolone, nebulised bronchodilators and antibiotics was started on admission. Having been profoundly dyspnoeic at rest at admission the patient's symptoms improved gradually over the next week until the patient returned to his baseline of dyspnoea on minimal physical exertion. He again requests if there is any other treatments that can ameliorate his symptoms.

Recent investigations are summarised below.

Forced vital capacity: 115 % predicted

Forced expiratory volume (1s): 34 % predicted

FEV1 / FVC: 30 % predicted

Haemoglobin	170 g / dL
White cell count	$15.8 \times 10^9/l$
Platelets	$167 \times 10^9/l$
Urea	6.7 mmol / L
Creatinine	98 micromol / L
Sodium	140 mmol / L
Potassium	4.1 mmol / L
Packed cell volume	0.42

What treatment is the best choice for relief of dyspnoea in this patient?



- ☒ A. Morphine sulphate modified release 10 mg twice daily
- ☐ B. Venesection
- ☐ C. Diazepam 2 mg four times daily

- ☐ D. Temazepam 10 mg at night
- ☐ E. Morphine sulphate liquid preparation 20 mg four times daily

Next question

The patient has end-stage COPD and has himself indicated that control of symptoms is his priority. As such, consideration of use of opioid or benzodiazepine medications for symptomatic relief of breathlessness is appropriate. A recent prospective study demonstrated that lower dose opioid use (< 30 mg daily oral morphine equivalent) does not increase risk of hospitalisation or increase mortality in patients with COPD on long-term oxygen therapy. The low dose of modified release morphine sulphate is therefore the correct answer in this question.

Benzodiazepines were shown to not increase admission rates but did increase mortality. The patients packed cell volume is normal; therefore venesection has no role in this case

Ekstrom M, Bornefalk-Hermansson A, Abernethy A, Currow D. Safety of benzodiazepines and opioids in very severe respiratory disease. BMJ 2014;348:g445.

COPD: stable management

NICE updated its guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy
- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 97 of 110

Next

Which one of the following is the main criteria for determining whether a patient with chronic obstructive pulmonary disease (COPD) should be offered long-term oxygen therapy?

- ☐ A. Two arterial blood gases measurements with $pO_2 < 6.3$ kPa
- ☐ B. One arterial blood gas measurement with $pO_2 < 7.7$ kPa
- ☐ C. One arterial blood gas measurement with $pO_2 < 8.3$ kPa
- ☐ D. One arterial blood gas measurement with $pO_2 < 8.0$ kPa
- ☒ E. Two arterial blood gases measurements with $pO_2 < 7.3$ kPa

Next question

COPD - LTOT if 2 measurements of $pO_2 < 7.3$ kPa

COPD: long-term oxygen therapy

The 2010 NICE guidelines on COPD clearly define which patients should be assessed for and offered long-term oxygen therapy (LTOT). Patients who receive LTOT should breathe supplementary oxygen for at least 15 hours a day. Oxygen concentrators are used to provide a fixed supply for LTOT.

Assess patients if any of the following:

- very severe airflow obstruction ($FEV_1 < 30\%$ predicted). Assessment should be 'considered' for patients with severe airflow obstruction ($FEV_1 30-49\%$ predicted)
- cyanosis
- polycythaemia
- peripheral oedema
- raised jugular venous pressure
- oxygen saturations less than or equal to 92% on room air

Assessment is done by measuring arterial blood gases on 2 occasions at least 3 weeks apart in

patients with stable COPD on optimal management.


Offer LTOT to patients with a pO₂ of < 7.3 kPa or to those with a pO₂ of 7.3 - 8 kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

Question 98 of 110

Next

A 19-year-old with 'brittle asthma' is seen in clinic. Three weeks ago she started taking prednisolone 15mg od as her asthma was poorly controlled on beclometasone dipropionate 800 mcg bd, salmeterol, oral montelukast and salbutamol as required. She is still having to use her salbutamol inhaler as least twice a day. What should happen with regards to inhaled steroids?

- ☐ A. Continue beclometasone dipropionate 800 mcg bd
- ☐ B. Stop inhaled steroids
-  ☒ C. Increase beclometasone dipropionate to 1000 mcg bd
- ☐ D. Decrease beclometasone dipropionate to 400 mcg bd
- ☐ E. Use beclometasone dipropionate 200 mcg on an 'as required' basis with salbutamol

Next question

Even when patients are on oral prednisolone they should continue high-dose inhaled corticosteroids

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
Step 1	Inhaled short-acting B2 agonist as required

Step 2	<p>Add inhaled steroid at 200-800 mcg/day*</p> <p>400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease</p>
Step 3	<p>1. Add inhaled long-acting B2 agonist (LABA)</p> <p>2. Assess control of asthma:</p> <ul style="list-style-type: none"> • good response to LABA - continue LABA • benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose) • no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/ day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
Step 4	<p>Consider trials of:</p> <ul style="list-style-type: none"> • increasing inhaled steroid up to 2000 mcg/day* • addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet • the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
Step 5	<p>Use daily steroid tablet in lowest dose providing adequate control. Consider other treatments to minimise the use of steroid tablets</p> <p>Maintain high dose inhaled steroid at 2000 mcg/day*</p> <p>Refer patient for specialist care</p>

*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
- have both anti-inflammatory and bronchodilatory properties
- should be used when patients are poorly controlled on high-dose inhaled corticosteroids and a long-acting b2-agonist

- particularly useful in aspirin-induced asthma
- associated with the development of Churg-Strauss syndrome

Fluticasone is more lipophilic and has a longer duration of action than beclometasone

Hydrofluoroalkane is now replacing chlorofluorocarbon as the propellant of choice. Only half the usually dose is needed with hydrofluoroalkane due to the smaller size of the particles

Long acting B2-agonists acts as bronchodilators but also inhibit mediator release from mast cells. Recent meta-analysis showed adding salmeterol improved symptoms compared to doubling the inhaled steroid dose

Question 99 of 110

Next

Following the 2014 National Review of Asthma Deaths, what number of courses of oral or intravenous steroids in the past 12 months should prompt referral to secondary care for optimisation of asthma treatment?

<input type="radio"/>	A. 1
<input checked="" type="radio"/>	B. 2
<input type="radio"/>	C. 3
<input type="radio"/>	D. 4
<input type="radio"/>	E. 5

Next question

Asthma: National Review of Asthma Deaths

In 2014 the Royal College of Physicians (RCP) published a review, 'Why asthma still kills: The National Review of Asthma Deaths (NRAD)', which received widespread media coverage. This

detailed review looked at 195 asthma deaths which occurred over a 12 month period. Much of this media focus was angled at poor GP management of patients with asthma. The following is a selected set of findings and recommendations. Please see the full report for a complete list - a link is provided.

Key findings of the report included:

- personal asthma action plans, acknowledged to improve asthma care, were known to be provided to only 44 (23%) of the 195 people who died from asthma
- there was no evidence that an asthma review had taken place in general practice in the last year before death for 84 (43%) of the 195 people who died
- the expert panels identified factors that could have avoided death in relation to the health professionals implementation of asthma guidelines in 89 (46%) of the 195 deaths, including lack of specific asthma expertise in 34 (17%) and lack of knowledge of the UK asthma guidelines in 48 (25%)
- inappropriate prescribing of long-acting beta agonist (LABA) bronchodilator inhalers. 27 (14%) of those who died were prescribed a single-component LABA bronchodilator at the time of death. At least five (3%) patients were on LABA monotherapy without inhaled corticosteroid preventer treatment

Selected recommendations include:

- referral to secondary care should be made if patients have required more than two courses of systemic corticosteroids, oral or injected, in the previous 12 months or require management using British Thoracic Society (BTS) stepwise treatment 4 or 5 to achieve control
- all patients who have been prescribed more than 12 reliever inhalers in the past 12 months should be invited for urgent review of their asthma control
- an assessment of inhaler technique should be routinely undertaken and formally documented at annual review
- non-adherence to inhaled corticosteroids is associated with increased risk of poor asthma control and should be continually monitored
- the use of combination inhalers should be encouraged. Where long-acting beta agonist (LABA) bronchodilators are prescribed for people with asthma, they should be prescribed with an inhaled corticosteroid in a single combination inhaler

Question 100 of 110

Next

You review a 57-year-old man. He was diagnosed with having asthma around 12 months ago after presenting with a persistent wheeze that was worse on exertion and at night time. A trial of salbutamol and initially improved his symptoms but he developed an infective exacerbation over winter and had Clenil 200mcg bd added to his medication around 3 months ago. Unfortunately his symptoms have not improved and he is more short-of-breath on exertion and has a persistent cough. You check his inhaler technique which is good. He has not smoked for the past 6 months, drinks alcohol in moderation and has a body mass index of 25 kg/m². What is the most important next step in management?

- ☐ A. Add a leukotriene receptor antagonist
- ☐ B. Add salmeterol
- ☒ C. Arrange a chest x-ray
- ☐ D. Increase the dose of Clenil
- ☐ E. Arrange spirometry

Next question

This patient's respiratory symptoms are not responding to standard treatment. He is an ex-smoker with a persistent cough so lung cancer must be excluded by a chest x-ray. Even if the chest x-ray is normal we should consider a respiratory referral for smokers/ex-smokers who have new, persistent or atypical symptoms.

Asthma: stepwise management in adults

The management of stable asthma is now well established with a step-wise approach:

Step	Management
Step 1	Inhaled short-acting B2 agonist as required
Step 2	Add inhaled steroid at 200-800 mcg/day* 400 mcg is an appropriate starting dose for many patients. Start at dose of inhaled steroid appropriate to severity of disease

Step	Management
Step 3	<p>1. Add inhaled long-acting B2 agonist (LABA)</p> <p>2. Assess control of asthma:</p> <ul style="list-style-type: none"> • good response to LABA - continue LABA • benefit from LABA but control still inadequate: continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose) • no response to LABA: stop LABA and increase inhaled steroid to 800 mcg/ day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
Step 4	<p>Consider trials of:</p> <ul style="list-style-type: none"> • increasing inhaled steroid up to 2000 mcg/day* • addition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet • the BTS say there is little evidence to separate the different options available. They do however suggest that leukotriene receptor antagonists are least likely to cause side-effects. Monitoring of serum concentrations may also be required for theophyllines
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*beclometasone dipropionate or equivalent

Additional notes

Leukotriene receptor antagonists

- e.g. Montelukast, zafirlukast
- have both anti-inflammatory and bronchodilatory properties
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Long acting B2-agonists acts as bronchodilators but also inhibit mediator release from mast cells. Recent meta-analysis showed adding salmeterol improved symptoms compared to doubling the inhaled steroid dose

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[Next](#)

You are reviewing a patient with chronic obstructive pulmonary disease (COPD) who remains breathless despite using an ipratropium bromide inhaler as required. Her FEV1 is 40%. What are the two main options?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Long-acting beta2-agonist (LABA) or inhaled corticosteroid |
| <input checked="" type="radio"/> | B. Long-acting muscarinic antagonist (LAMA) or LABA + inhaled corticosteroid (ICS) in a combination inhaler |
| <input type="radio"/> | C. Long-acting beta2-agonist (LABA) or long-acting muscarinic antagonist (LAMA) |
| <input type="radio"/> | D. Long-acting beta2-agonist (LABA) or regular combined short-acting beta2-agonist + muscarinic antagonist (e.g. Combivent) |
| <input type="radio"/> | E. Long-acting muscarinic antagonist (LAMA) + inhaled corticosteroid (ICS) in a combination inhaler or long-acting beta2-agonist (LABA) |

[Next question](#)

COPD - still breathless despite using inhalers as required?

- FEV1 > 50%: LABA **or** LAMA
- FEV1 < 50%: LABA + ICS **or** LAMA

COPD: stable management

NICE updated its guidelines on the management of chronic obstructive pulmonary disease (COPD) in 2010.

General management

- smoking cessation advice
- annual influenza vaccination
- one-off pneumococcal vaccination

Bronchodilator therapy

- a short-acting beta2-agonist (SABA) or short-acting muscarinic antagonist (SAMA) is first-line treatment
- for patients who remain breathless or have exacerbations despite using short-acting bronchodilators the next step is determined by the FEV1

FEV1 > 50%

- long-acting beta2-agonist (LABA), for example salmeterol, or:
- long-acting muscarinic antagonist (LAMA), for example tiotropium

FEV1 < 50%

- LABA + inhaled corticosteroid (ICS) in a combination inhaler, or:
- LAMA

For patients with persistent exacerbations or breathlessness

- if taking a LABA then switch to a LABA + ICS combination inhaler
- otherwise give a LAMA and a LABA + ICS combination inhaler

Oral theophylline

- NICE only recommends theophylline after trials of short and long-acting bronchodilators or to people who cannot use inhaled therapy

- the dose should be reduced if macrolide or fluoroquinolone antibiotics are co-prescribed

Mucolytics

- should be 'considered' in patients with a chronic productive cough and continued if symptoms improve

Cor pulmonale

- features include peripheral oedema, raised jugular venous pressure, systolic parasternal heave, loud P2
- use a loop diuretic for oedema, consider long-term oxygen therapy
- ACE-inhibitors, calcium channel blockers and alpha blockers are not recommended by NICE

Factors which may improve survival in patients with stable COPD

- smoking cessation - the single most important intervention in patients who are still smoking
- long term oxygen therapy in patients who fit criteria
- lung volume reduction surgery in selected patients

Question 102 of 110

Next

You receive a prescription request for a 7-year-old girl who has recently emigrated to the UK. She has been diagnosed as having latent tuberculosis and a 6 month course of isoniazid therapy has been recommended. The dose for children aged 1 month - 12 years is 5mg/kg daily (max. 300mg daily). She weighs 27kg. Her father does not feel she would be able to take tablets and a special pharmacy order for isoniazid syrup 50mg/5ml is made. What volume of isoniazid syrup should she be given each day?

Next question

Correct answer: **13.5 ml**

The recommended dose for this child = $5\text{mg/kg} \times 27\text{kg} = 135\text{mg}$

To make the calculation easier we can 'cancel down' the concentration from 50mg/5ml to 10mg/1ml, by dividing both values by 5

The correct volume is therefore $135 / 10 = 13.5 \times 1 = 13.5\text{ml}$

The October 2011 AKT feedback stated: *'We regularly test candidates' ability to calculate drug doses, for example where the drugs need to be given in mg/kg. A worrying number of candidates were apparently unable to correctly perform a relatively simple calculation regarding a drug dose for a child, and this poses concerns about patient safety. '*

Tuberculosis: drug therapy

The standard therapy for treating **active tuberculosis** is:

Initial phase - first 2 months (RIPE)

- Rifampicin
- Isoniazid
- Pyrazinamide
- Ethambutol (the 2006 NICE guidelines now recommend giving a 'fourth drug' such as ethambutol routinely - previously this was only added if drug-resistant tuberculosis was suspected)

Continuation phase - next 4 months

- Rifampicin
- Isoniazid

The treatment for **latent tuberculosis** is isoniazid alone for 6 months

Patients with **meningeal tuberculosis** are treated for a prolonged period (at least 12 months) with the addition of steroids

Directly observed therapy with a three times a week dosing regimen may be indicated in certain groups, including:

- homeless people with active tuberculosis
- patients who are likely to have poor concordance
- all prisoners with active or latent tuberculosis

Question 103 of 110

Next

You are reviewing the management of a number of patients with chronic obstructive pulmonary disease (COPD). Which one of the following factors should prompt an assessment for long-term oxygen therapy?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Failure to respond to inhaled and/or oral corticosteroids |
| <input type="radio"/> | B. FEV1/FVC of 0.47 |
| <input type="radio"/> | C. Haemoglobin of 10.1 g/dl |
| <input type="radio"/> | D. Anxiety relating to chronic shortness-of-breath |
| <input checked="" type="radio"/> | E. Ankle oedema |

Next question

COPD: long-term oxygen therapy

The 2010 NICE guidelines on COPD clearly define which patients should be assessed for and offered long-term oxygen therapy (LTOT). Patients who receive LTOT should breathe supplementary oxygen for at least 15 hours a day. Oxygen concentrators are used to provide a fixed supply for LTOT.

Assess patients if any of the following:

- very severe airflow obstruction (FEV1 < 30% predicted). Assessment should be 'considered' for patients with severe airflow obstruction (FEV1 30-49% predicted)
- cyanosis
- polycythaemia

- peripheral oedema
- raised jugular venous pressure
- oxygen saturations less than or equal to 92% on room air

Assessment is done by measuring arterial blood gases on 2 occasions at least 3 weeks apart in patients with stable COPD on optimal management.

Offer LTOT to patients with a pO₂ of < 7.3 kPa or to those with a pO₂ of 7.3 - 8 kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

Question 104 of 110

Next

A 39-year-old man presents with shortness of breath following one week of flu-like symptoms. He also has a non-productive cough but no chest pain. A chest x-ray shows bilateral consolidation and examination reveals erythematous lesions on his limbs and trunk. Which one of the following investigations is most likely to be diagnostic?

- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Cold agglutins |
| <input type="radio"/> | B. Sputum culture |
| <input type="radio"/> | C. Urinary antigen for Legionella |
| <input checked="" type="radio"/> | D. Serology for Mycoplasma |
| <input type="radio"/> | E. Blood culture |

Next question

Mycoplasma? - serology is diagnostic

The flu-like symptoms, bilateral consolidation and erythema multiforme point to a diagnosis of *Mycoplasma*. The most appropriate diagnostic test is *Mycoplasma* serology

Mycoplasma pneumoniae

Mycoplasma pneumoniae is a cause of atypical pneumonia which often affects younger patients. It is associated with a number of characteristic complications such as erythema multiforme and cold autoimmune haemolytic anaemia. Epidemics of *Mycoplasma pneumoniae* classically occur every 4 years. It is important to recognise atypical pneumonias as they may not respond to penicillins or cephalosporins due to it lacking a peptidoglycan cell wall.

Features

- the disease typically has a prolonged and gradual onset
- flu-like symptoms classically precede a dry cough
- bilateral consolidation on x-ray
- complications may occur as below

Complications

- cold agglutins (IgM) may cause an haemolytic anaemia, thrombocytopenia
- erythema multiforme, erythema nodosum
- meningoencephalitis, Guillain-Barre syndrome
- bullous myringitis: painful vesicles on the tympanic membrane
- pericarditis/myocarditis
- gastrointestinal: hepatitis, pancreatitis
- renal: acute glomerulonephritis

Investigations

- diagnosis is generally by *Mycoplasma* serology
- positive cold agglutination test

Management

- erythromycin/clarithromycin
- tetracyclines such as doxycycline are an alternative

Question 105 of 110

Next

Which one of the following markers is most useful for monitoring the progression of patients with chronic obstructive pulmonary disease?

- ☐ A. FEV1/FVC ratio
- ☐ B. Lifestyle questionnaire
- ☐ C. Oxygen saturations
-  ☒ D. FEV1
- ☐ E. Number of exacerbations per year

Next question

COPD: investigation and diagnosis

NICE recommend considering a diagnosis of COPD in patients over 35 years of age who are smokers or ex-smokers and have symptoms such as exertional breathlessness, chronic cough or regular sputum production.

The following investigations are recommended in patients with suspected COPD:

- post-bronchodilator spirometry to demonstrate airflow obstruction: FEV1/FVC ratio less than 70%
- chest x-ray: hyperinflation, bullae, flat hemidiaphragm. Also important to exclude lung cancer
- full blood count: exclude secondary polycythaemia
- body mass index (BMI) calculation

The severity of COPD is categorised using the FEV1*:

Post-bronchodilator FEV1/FVC	FEV1 (of predicted)	Severity
< 0.7	> 80%	Stage 1 - Mild**

< 0.7	50-79%	Stage 2 - Moderate
< 0.7	30-49%	Stage 3 - Severe
< 0.7	< 30%	Stage 4 - Very severe

Measuring peak expiratory flow is of limited value in COPD, as it may underestimate the degree of airflow obstruction.

*note that the grading system has changed following the 2010 NICE guidelines. If the FEV1 is greater than 80% predicted but the post-bronchodilator FEV1/FVC is < 0.7 then this is classified as Stage 1 - mild

**symptoms should be present to diagnose COPD in these patients

Question 106 of 110

Next

A 65-year-old life-long smoker with a significant past history of asbestos exposure is investigated for lung cancer. Given his history of both smoking and asbestos exposure, what is his increased risk of lung cancer?

- ☐ A. 5
- ☐ B. 10
- ☒ C. 50
- ☐ D. 500
- ☐ E. 1,000

Next question

Lung cancer: risk factors

Smoking

- increases risk of lung ca by a factor of 10

Other factors

- asbestos - increases risk of lung ca by a factor of 5
- arsenic
- radon
- nickel
- chromate
- aromatic hydrocarbon
- cryptogenic fibrosing alveolitis

Factors that are NOT related

- coal dust

Smoking and asbestos are synergistic, i.e. a smoker with asbestos exposure has a $10 * 5 = 50$ times increased risk

Question 107 of 110

Next

A 45-year-old female develops pleuritic chest pain following a hysterectomy 10 days ago. You admit her to the acute medical unit and a CTPA confirms a pulmonary embolism. There is no previous history of venous thromboembolism. How long should the patient be warfarinised for?

- | | |
|----------------------------------|-------------------------------------|
| <input type="radio"/> | A. Not suitable for anticoagulation |
| <input checked="" type="radio"/> | B. 3 months |
| <input type="radio"/> | C. 6 months |

☐ D. 4 weeks

☐ E. Life-long

Next question

As this patient has a temporary risk factor for a thromboembolic event the recommended period of anticoagulation is 3 months.

Pulmonary embolism: management

The NICE guidelines of 2012 provided some clarity on how long patients should be anticoagulated for after a pulmonary embolism (PE). Selected points are listed below.

Low molecular weight heparin (LMWH) or fondaparinux should be given initially after a PE is diagnosed. An exception to this is for patients with a massive PE where thrombolysis is being considered. In such a situation unfractionated heparin should be used.

- a vitamin K antagonist (i.e. warfarin) should be given within 24 hours of the diagnosis
- the LMWH or fondaparinux should be continued for at least 5 days or until the international normalised ratio (INR) is 2.0 or above for at least 24 hours, whichever is longer, i.e. LMWH or fondaparinux is given at the same time as warfarin until the INR is in the therapeutic range
- warfarin should be continued for at least 3 months. At 3 months, NICE advise that clinicians should 'assess the risks and benefits of extending treatment'
- NICE advise extending warfarin beyond 3 months for patients with *unprovoked* PE. This essentially means that if there was no obvious cause or provoking factor (surgery, trauma, significant immobility) it may imply the patient has a tendency to thrombosis and should be given treatment longer than the norm of 3 months
- for patients with active cancer NICE recommend using LMWH for 6 months

Thrombolysis

- thrombolysis is now recommended as the first-line treatment for massive PE where there is circulatory failure (e.g. hypotension). Other invasive approaches should be considered where appropriate facilities exist

Question 108 of 110

Next

A 19-year-old woman presents with a night-time cough and a wheezy sensation after exercising. She has a past history of eczema. She is a non-smoker. Her mother is a known asthmatic. Examination of her chest today is unremarkable.

You arrange spirometry which is reported as normal, with a FEV1/FVC of 0.72.

What is the most appropriate next step?

- ✓ ☒ A. Trial of a salbutamol inhaler
- ☐ B. Arrange an ECG
- ☐ C. Perform a full blood count to check for eosinophilia
- ☐ D. Arrange a chest x-ray
- ☐ E. Refer to the respiratory clinic

Next question

This patient has a high probability of asthma - they should therefore be given a trial of treatment. An improvement in symptoms would be classed as a positive reversibility test.

Asthma: diagnosis in adults

Whilst the diagnosis of asthma remains largely clinical, the British Thoracic Society (BTS) guidelines do offer some guidance on how we should approach this problem, for both adults and children. They recommend we classify patients as having either a high, intermediate or low probability of asthma based on the presence or absence of certain symptoms:

For adults it is recommend that they have a **clinical assessment including spirometry** (or Peak Expiratory Flow measurement if spirometry is not available):

When assessing patients we should therefore look for symptoms which may support a diagnosis of asthma, and those which may point to an alternative diagnosis. The BTS produced a list of features which are helpful when deciding this:

Features which make a diagnosis of asthma more likely

Features which make a diagnosis of asthma less likely

Features which make a diagnosis of asthma more likely	Features which make a diagnosis of asthma less likely
<p>More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:</p> <ul style="list-style-type: none"> • symptoms worse at night and in the early morning • symptoms in response to exercise, allergen exposure and cold air • symptoms after taking aspirin or beta blockers <p>History of atopic disorder</p> <p>Family history of asthma and/or atopic disorder</p> <p>Widespread wheeze heard on auscultation of the chest</p> <p>Otherwise unexplained low FEV1 or PEF (historical or serial readings)</p> <p>Otherwise unexplained peripheral blood eosinophilia</p>	<p>Prominent dizziness, light-headedness, peripheral tingling</p> <p>Chronic productive cough in the absence of wheeze or breathlessness</p> <p>Repeatedly normal physical examination of chest when symptomatic</p> <p>Voice disturbance</p> <p>Symptoms with colds only</p> <p>Significant smoking history (ie > 20 pack-years)</p> <p>Cardiac disease</p> <p>Normal PEF or spirometry when symptomatic</p>

If a patient has many symptoms which make a diagnosis of asthma more likely (i.e. a **high probability**) then the BTS recommend that we start a trial of treatment. A good response is considered a positive 'test of reversibility'. If a patient has a poor response to treatment then further investigations should be considered.

What is the most appropriate initial treatment?

The BTS state the following:

Patients should start treatment at the step most appropriate to the initial severity of their asthma

This means that for some patients prescribing a corticosteroid inhaler in addition to a salbutamol inhaler is appropriate. The BTS suggest the following patients would benefit from a corticosteroid inhaler:

Inhaled steroids should be considered for patients with any of the following asthma-related features:

- *exacerbations of asthma in the last two years*
- *using inhaled β_2 agonists three times a week or more*
- *symptomatic three times a week or more*
- *waking one night a week*

The last two points are probably the most relevant to newly diagnosed patients.

For patients with a **low probability** of asthma then an alternative diagnosis should be sought. Further investigations and referral to a respiratory specialist should be considered.

If a patient has an **intermediate probability** of asthma the BTS recommend *'to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a diagnosis and establishing maintenance treatment.'* The accompanying algorithm suggests this decision should be partly guided by the FEV₁/FVC ratio - a ratio of < 0.7 is suggestive of asthma.

It should of course be noted that spirometry may be normal in asymptomatic patients so it may be necessary to repeat spirometry or peak flow readings on a number of occasions in patients where the diagnosis is not clear.

Recent studies have shown the limited value of other 'objective' tests. It is now recognised that in patients with normal or near-normal pre-treatment lung function there is little room for measurable improvement in FEV1 or peak flow.

A > 400 ml improvement in FEV1 is considered significant

- before and after 400 mcg inhaled salbutamol in patients with diagnostic uncertainty and airflow obstruction present at the time of assessment
- if there is an incomplete response to inhaled salbutamol, after either inhaled corticosteroids (200 mcg twice daily beclometasone equivalent for 6-8 weeks) or oral prednisolone (30 mg once daily for 14 days)

It is now advised to interpret peak flow variability with caution due to the poor sensitivity of the test

- diurnal variation % = [(Highest - Lowest PEFr) / Highest PEFr] x 100
- assessment should be made over 2 weeks
- greater than 20% diurnal variation is considered significant

Question 109 of 110

Next

Each of the following organisms commonly cause respiratory tract infections in patients with cystic fibrosis, except:

- | | |
|----------------------------------|-------------------------------------|
| <input type="radio"/> | A. <i>Aspergillus</i> |
| <input type="radio"/> | B. <i>Pseudomonas aeruginosa</i> |
| <input type="radio"/> | C. <i>Burkholderia cepacia</i> |
| <input type="radio"/> | D. <i>Staphylococcal aureus</i> |
| <input checked="" type="radio"/> | E. <i>Strongyloides stercoralis</i> |

Next question

Cystic fibrosis

Cystic fibrosis (CF) is an autosomal recessive disorder causing increased viscosity of secretions (e.g. lungs and pancreas). It is due to a defect in the cystic fibrosis transmembrane conductance regulator gene (CFTR), which codes a cAMP-regulated chloride channel

In the UK 80% of CF cases are due to delta F508 on the long arm of chromosome 7. Cystic fibrosis affects 1 per 2500 births, and the carrier rate is c. 1 in 25

Organisms which may colonise CF patients

- *Staphylococcus aureus*
- *Pseudomonas aeruginosa*
- *Burkholderia cepacia**
- *Aspergillus*

*previously known as *Pseudomonas cepacia*

Question 110 of 110

You are working in the out-patient respiratory clinic where a 62 year old female patient attends for follow-up. She has a diagnosis of COPD (FEV1/FVC= 0.68, FEV1=46% predicted) and currently smokes 30 cigarettes per day. She has noted progressive ankle swelling over last year but has not suffered any exacerbations in this time. She currently takes a tiotropium inhaler as well as a combination inhaler of salmeterol/fluticasone with a salbutamol inhaler when required, her inhaler technique has been assessed as good. In clinic her arterial blood gas results on air give a pO₂ of 7.3kPa and 7.8kPa respectively from today and from clinic two months ago.

The patient would like to be considered for home oxygen therapy. According to current NICE guidelines what advice should you give her?

- ☐ A. She does not qualify for home oxygen as her oxygen levels are too high
- ☐ B. Home oxygen is contraindicated as she is a current smoker
- ☐ C. No proven survival benefit of long term oxygen has been demonstrated in COPD patients
- ☒ D. Agree to arrange home oxygen but warn of the risk of fire or explosion
- ☐ E. Advise a trial of maintenance oral steroids in the first instance

This question essentially tests the candidates knowledge of the indications for long term oxygen therapy (LTOT) in COPD patients.

Generally speaking, LTOT is indicated for COPD patients with PaO₂<7.3kPa when stable. However this cut-off is extended to <8kPa when one or more of the following is present; secondary polycythaemia, pulmonary hypertension, nocturnal hypoxaemia, or as is the case in this question, peripheral oedema. Assessment of arterial oxygen concentration should be performed when stable and with two readings at least three weeks apart. Supplementary oxygen should be used for a minimum of 15 hours per day, but effect is greater if used for more than 20 hours per day.

Maintenance oral corticosteroid use is not routinely recommended and is only generally indicated when unable to fully wean steroids between exacerbations.

Perhaps surprisingly, in reference to smoking and LTOT, current NICE guidance states 'patients should be warned of the risk of fire or explosion if they continue to smoke when prescribed oxygen'.

A better answer would be to offer smoking cessation in the first instance and to reinforce this aggressively, but this option is not given.

COPD: long-term oxygen therapy

The 2010 NICE guidelines on COPD clearly define which patients should be assessed for and offered long-term oxygen therapy (LTOT). Patients who receive LTOT should breathe supplementary oxygen for at least 15 hours a day. Oxygen concentrators are used to provide a fixed supply for LTOT.

Assess patients if any of the following:

- very severe airflow obstruction ($FEV_1 < 30\%$ predicted). Assessment should be 'considered' for patients with severe airflow obstruction ($FEV_1 30-49\%$ predicted)
- cyanosis
- polycythaemia
- peripheral oedema
- raised jugular venous pressure
- oxygen saturations less than or equal to 92% on room air

Assessment is done by measuring arterial blood gases on 2 occasions at least 3 weeks apart in patients with stable COPD on optimal management.

Offer LTOT to patients with a pO_2 of < 7.3 kPa or to those with a pO_2 of $7.3 - 8$ kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

=====

Question 1 of 174

Next

A rapid finger-prick blood test to help diagnosis deep vein thrombosis is developed. Comparing the test to current standard techniques a study is done on 1,000 patients:

	DVT present	DVT absent
New test positive	200	100
New test negative	20	680

What is the specificity of the new test?

- ☐ A. 680/880
- ☐ B. 200/220
- ☒ C. 680/780
- ☐ D. 680/700
- ☐ E. 200/300

Next question

Specificity = true negatives / (true negatives + false positives)

$$= 680 / (680 + 100)$$

Screening test statistics

Patients and doctors need to know if a disease or condition is present or absent. Tests can be used to help us decide. Tests generally guide us by indicating how likely it is that the patient has the condition.

In order to interpret test results we need to have a working knowledge of the statistics used to describe them.

Contingency tables (also known as 2 * 2 tables, see below) are used to illustrate and calculate test statistics such as sensitivity. It would be unusual for a medical exam not to feature a question based around screening test statistics. Commit the following table to memory and spend time practicing

using it as you will be expected to make calculations using it in your exam.

TP = true positive; FP = false positive; TN = true negative; FN = false negative

	Disease present	Disease absent
Test positive	TP	FP
Test negative	FN	TN

The table below lists the main statistical terms used in relation to screening tests:

Measure	Formula	Plain english
Sensitivity	$TP / (TP + FN)$	Proportion of patients with the condition who have a positive test result
Specificity	$TN / (TN + FP)$	Proportion of patients without the condition who have a negative test result
Positive predictive value	$TP / (TP + FP)$	The chance that the patient has the condition if the diagnostic test is positive
Negative predictive value	$TN / (TN + FN)$	The chance that the patient does not have the condition if the diagnostic test is negative
Likelihood ratio for a positive test result	$\text{sensitivity} / (1 - \text{specificity})$	How much the odds of the disease increase when a test is positive
Likelihood ratio for a negative test result	$(1 - \text{sensitivity}) / \text{specificity}$	How much the odds of the disease decrease when a test is negative

Positive and negative predictive values are prevalence dependent. Likelihood ratios are not prevalence dependent.

Precision

The precision quantifies a tests ability to produce the same measurements with repeated tests.

Theme: Statistical terms: descriptive statistics

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5
- F. 6
- G. 7
- H. 8
- I. 9
- J. 10

You are reviewing the case notes of seven patients who have COPD. You record the number of exacerbations they have had in the past year as follows: 1,0,1,5,4,2,1

2. What is the mode?

1

3. What is the mean?

The correct answer is 2

4. What is the median value?

The correct answer is 1

Statistical terms: descriptive statistics

The table below gives a brief definition of commonly encountered terms:

Term	Description
Mean	The average of a series of observed values
Median	The middle value if series of observed values are placed in order
Mode	The value that occurs most frequently within a dataset
Range	The difference between the largest and smallest observed value

Question 7 of 174

Next

As part of a research project you are trying to ascertain whether the use of dummies in infants is linked to sudden infant death syndrome. What is the most appropriate form of study design?

- ☐ A. Randomised controlled trial
- ☐ B. Cross-over trial
- ☐ C. Cross-sectional survey
- ☐ D. Case-control study
- ☐ E. Cohort study

Next question

As sudden infant death syndrome is relatively rare a case-control design is more appropriate than a cohort study.

Study design

The following table highlights the main features of the main types of study:

Study type	Key features
Randomised controlled trial	Participants randomly allocated to intervention or control group (e.g. standard treatment or placebo) Practical or ethical problems may limit use
Cohort study	Observational and prospective. Two (or more) are selected according to their exposure to a particular agent (e.g. medicine, toxin) and followed up to see how many develop a disease or other outcome. The usual outcome measure is the relative risk. Examples include Framingham Heart Study
Case-control study	Observational and retrospective. Patients with a particular condition (cases) are identified and matched with controls. Data is then collected on past exposure to a possible causal agent for the condition. The usual outcome measure is the odds ratio. Inexpensive, produce quick results Useful for studying rare conditions Prone to confounding
Cross-sectional survey	Provide a 'snapshot', sometimes called prevalence studies Provide weak evidence of cause and effect

Question 8 of 174

[Next](#)

A study looks at the use of bisphosphonates in controlling the pain associated with bone metastases. One hundred and twenty patients (120) are enrolled in the study, 40 of whom are given conventional treatment with NSAIDs and radiotherapy. Of the 80 patients who were given bisphosphonates, 40 received significant pain relief.

What is the odds of patient with bone metastases receiving significant pain relief from bisphosphonates?

- ☐ A. 0.33
- ☐ B. 3
- ☐ C. 2
- ☒ D. 1
- ☐ E. 0.5

[Next question](#)

The question is limited to the 80 patients who've been given bisphosphonates. Odds are a ratio of the number of people who incur a particular outcome to the number of people who do not incur the outcome.

40 of the 80 patients received significant pain relief

It can therefore be inferred that 40 of the 80 patients did not receive significant pain relief.

Therefore the odds are $40 / 40 = 1$

Odds and odds ratio

Odds are a ratio of the number of people who incur a particular outcome to the number of people who do not incur the outcome. The odds ratio may be defined as the ratio of the odds of a particular outcome with experimental treatment and that of control.

Odds vs. probability

In contrast, probability is the fraction of times you'd expect to see an event in many trials. When expressed as a single number probability is always between 0 and 1. So, if we take the example of rolling a dice:

- the probability of rolling a six is $1/6$ or 0.166666
- the odds of rolling a six is $1/5$ or 0.2

Odds ratios are the usual reported measure in case-control studies. It approximates to relative risk if the outcome of interest is rare.

For example, if we look at a trial comparing the use of paracetamol for dysmenorrhoea compared to placebo we may get the following results

	Total number of patients	Achieved = 50% pain relief
Paracetamol	60	40
Placebo	90	30

The odds of achieving significant pain relief with paracetamol = $40 / 20 = 2$

The odds of achieving significant pain relief with placebo = $30 / 60 = 0.5$

Therefore the odds ratio = $2 / 0.5 = 4$

Question 9 of 174

Next

Which one of the following may be used to calculate the number needed to treat?

- ☐ A. $1 / (\text{Absolute risk reduction})$
- ☐ B. $(\text{Absolute Risk Reduction}) / (\text{Number of people in trial})$
- ☐ C. $((\text{Control event rate}) - (\text{Experimental event rate})) / (\text{Control event rate})$
- ☐ D. $1 / (\text{Relative risk})$
- ☐ E. $1 / (\text{Hazard ratio})$

Next question

NNT = $1 / \text{Absolute Risk Reduction}$

Numbers needed to treat and absolute risk reduction

Numbers needed to treat (NNT) is a measure that indicates how many patients would require an intervention to reduce the expected number of outcomes by one

It is calculated by $1/(\text{Absolute risk reduction})$ and is rounded to the next highest whole number

Experimental event rate (EER) = (Number who had particular outcome with the intervention) / (Total number who had the intervention)

Control event rate (CER) = (Number who had particular outcome with the control/ (Total number who had the control)

Absolute risk reduction = CER-EER or EER-CER?

The absolute risk reduction (ARR) may be calculated by finding the absolute difference between the control event rate (CER) and the experimental event rate (EER). You will often find both versions of the above listed in different sources. In some ways it doesn't matter which you use as you will end up with the same answer but from a technical point of view:

- if the outcome of the study is undesirable then $ARR = CER - EER$
- if the outcome of the study is desirable then $ARR^* = EER - CER$

*this may be more accurately termed absolute benefit increase, rather than absolute risk reduction

Question 11 of 174

Next

You are performing a study of blood pressure readings in patients with chronic kidney disease. Assuming that the results are normally distributed, what percentage of values lie within two standard deviations of the mean blood pressure reading?



A. 95.4%

<input type="radio"/>	B.	5.3%
<input type="radio"/>	C.	98.3%
<input type="radio"/>	D.	10%
<input type="radio"/>	E.	97.5%

Next question

Normal distribution

The normal distribution is also known as the Gaussian distribution or 'bell-shaped' distribution. It describes the spread of many biological and clinical measurements

Properties of the Normal distribution

- symmetrical i.e. Mean = mode = median
- 68.3% of values lie within 1 SD of the mean
- 95.4% of values lie within 2 SD of the mean
- 99.7% of values lie within 3 SD of the mean
- this is often reversed, so that within 1.96 SD of the mean lie 95% of the sample values
- the range of the mean - (1.96 * SD) to the mean + (1.96 * SD) is called the 95% confidence interval, i.e. If a repeat sample of 100 observations are taken from the same group 95 of them would be expected to lie in that range

Standard deviation

- the standard deviation (SD) is a measure of how much dispersion exists from the mean
- SD = square root (variance)

Question 12 of 174

Next

You have been asked to investigate the potential benefit of setting up a service to help patients with multiple sclerosis in the local area. What is the most important factor when determining how many resources will be required?

- | | |
|-----------------------|---------------------|
| <input type="radio"/> | A. Incidence |
| <input type="radio"/> | B. Bayesian factor |
| <input type="radio"/> | C. Prevalence |
| <input type="radio"/> | D. Denominator data |
| <input type="radio"/> | E. P value |

Next question

Incidence and prevalence

These two terms are used to describe the frequency of a condition in a population.

The **incidence** is the number of new cases per population in a given time period.

For example, if condition X has caused 40 new cases over the past 12 months per 1,000 of the population the annual incidence is 0.04 or 4%.

The **prevalence** is the total number of cases per population at a particular point in time.

For example, imagine a questionnaire is sent to 2,500 adults asking them how much they weigh. If from this sample population of 500 of the adults were obese then the prevalence of obesity would be 0.2 or 20%.

Relationship

- $\text{prevalence} = \text{incidence} * \text{duration of condition}$
- in chronic diseases the prevalence is much greater than the incidence
- in acute diseases the prevalence and incidence are similar. For conditions such as the common cold the incidence may be greater than the prevalence

Question 13 of 174

Next

A new drug designed to prevent exacerbations of genital herpes undergoes clinical trials. One hundred patients are given the new drug. During a three month period 10 of the patients have an episode of genital herpes. In the control group there are 300 patients who are given a placebo. In this group 50 people have an exacerbation during the same time period. What is the relative risk of having an exacerbation of genital herpes whilst taking the new drug?

- ☐ A. 0.8
- ☐ B. 0.2
- ☐ C. 1.66
- ☐ D. 0.6
- ☐ E. 0.06

Next question

Experimental event rate, $EER = 10 / 100 = 0.10$

Control event rate, $CER = 50 / 300 = 0.166$

Therefore the relative risk = $EER / CER = 0.1 / 0.166 = 0.6$

Relative risk

Relative risk (RR) is the ratio of risk in the experimental group (experimental event rate, EER) to risk in the control group (control event rate, CER). The term relative risk ratio is sometimes used instead of relative risk.

To recap

- EER = rate at which events occur in the experimental group
- CER = rate at which events occur in the control group

For example, if we look at a trial comparing the use of paracetamol for dysmenorrhoea compared to placebo we may get the following results

	Total number of patients	Experienced significant pain relief
Paracetamol	100	60
Placebo	80	20

Experimental event rate, $EER = 60 / 100 = 0.6$

Control event rate, $CER = 20 / 80 = 0.25$

Therefore the relative risk ratio = $EER / CER = 0.6 / 0.25 = 2.4$

If the risk ratio is > 1 then the rate of an event (in this case experiencing significant pain relief) is increased compared to controls. It is therefore appropriate to calculate the relative risk increase if necessary (see below).

If the risk ratio is < 1 then the rate of an event is decreased compared to controls. The relative risk reduction should therefore be calculated (see below).

Relative risk reduction (RRR) or **relative risk increase (RRI)** is calculated by dividing the absolute risk change by the control event rate

Using the above data, $RRI = (EER - CER) / CER = (0.6 - 0.25) / 0.25 = 1.4 = 140\%$

Question 14 of 174

Next

A cohort study is being designed to look at the relationship between smoking and breast cancer. What is the usual outcome measure in a cohort study?

- ☐ A. Odds ratio
- ☐ B. Experimental event rate
- ☐ C. Relative risk
- ☐ D. Absolute risk increase
- ☐ E. Numbers needed to harm

Cohort studies - relative risk

Study design

The following table highlights the main features of the main types of study:

Study type	Key features
Randomised controlled trial	Participants randomly allocated to intervention or control group (e.g. standard treatment or placebo) Practical or ethical problems may limit use
Cohort study	Observational and prospective. Two (or more) are selected according to their exposure to a particular agent (e.g. medicine, toxin) and followed up to see how many develop a disease or other outcome. The usual outcome measure is the relative risk. Examples include Framingham Heart Study
Case-control study	Observational and retrospective. Patients with a particular condition (cases) are identified and matched with controls. Data is then collected on past exposure to a possible causal agent for the condition. The usual outcome measure is the odds ratio. Inexpensive, produce quick results Useful for studying rare conditions Prone to confounding
Cross-sectional survey	Provide a 'snapshot', sometimes called prevalence studies Provide weak evidence of cause and effect

Question 43 of 174

A new blood test to screen patients for heart failure is trialled on 500 patients. The test was positive in 40 of the 50 patients shown to have heart failure by echocardiography. It was also positive in 20 patients who were shown not to have heart failure. What is the positive predictive value of the test?

- ☐ A. 0.8
- ☐ B. 0.66
- ☐ C. 0.33
- ☐ D. 0.1
- ☐ E. Cannot be calculated

A contingency table can be constructed from the above data, as shown below:

	Heart failure	No heart failure
Test positive	40	20
Test negative	10	430

Positive predictive value = $TP / (TP + FP) = 40 / (40 + 20) = 0.66$

Screening test statistics

Patients and doctors need to know if a disease or condition is present or absent. Tests can be used to help us decide. Tests generally guide us by indicating how likely it is that the patient has the condition.

In order to interpret test results we need to have a working knowledge of the statistics used to describe them.

Contingency tables (also known as 2 * 2 tables, see below) are used to illustrate and calculate test statistics such as sensitivity. It would be unusual for a medical exam not to feature a question based around screening test statistics. Commit the following table to memory and spend time practicing using it as you will be expected to make calculations using it in your exam.

TP = true positive; FP = false positive; TN = true negative; FN = false negative

	Disease present	Disease absent
Test positive	TP	FP
Test negative	FN	TN

The table below lists the main statistical terms used in relation to screening tests:

Measure	Formula	Plain english
Sensitivity	$TP / (TP + FN)$	Proportion of patients with the condition who have a positive test result
Specificity	$TN / (TN + FP)$	Proportion of patients without the condition who have a negative test result
Positive predictive value	$TP / (TP + FP)$	The chance that the patient has the condition if the diagnostic test is positive
Negative predictive value	$TN / (TN + FN)$	The chance that the patient does not have the condition if the diagnostic test is negative
Likelihood ratio for a positive test result	$\text{sensitivity} / (1 - \text{specificity})$	How much the odds of the disease increase when a test is positive
Likelihood ratio for a negative test result	$(1 - \text{sensitivity}) / \text{specificity}$	How much the odds of the disease decrease when a test is negative

Positive and negative predictive values are prevalence dependent. Likelihood ratios are not prevalence dependent.

Precision

The precision quantifies a tests ability to produce the same measurements with repeated tests.

Question 44-46 of 174

Theme: Screening test statistics

- A. $TN / (TN + FN)$
- B. $TP / (TP + FN)$
- C. Sensitivity / (1 - specificity)
- D. $TP / (TP + FP)$
- E. $TN / (TN + FP)$
- F. (1 - sensitivity) / specificity

For each one of the following statistical terms listed below select the correct equation

TP = true positive; FP = false positive; TN = true negative; FN = false negative

44. Sensitivity

$$TP / (TP + FN)$$

45. Positive predictive value

$$TP / (TP + FP)$$

46. Specificity

$$TN / (TN + FP)$$

[Next question](#)

Screening test statistics

Patients and doctors need to know if a disease or condition is present or absent. Tests can be used to help us decide. Tests generally guide us by indicating how likely it is that the patient has the condition.

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Likelihood ratio for a negative test result	$(1 - \text{sensitivity}) / \text{specificity}$	How much the odds of the disease decrease when a test is negative

Positive and negative predictive values are prevalence dependent. Likelihood ratios are not prevalence dependent.

Precision

The precision quantifies a tests ability to produce the same measurements with repeated tests.

Question 47 of 174

A new drug is trialled for the treatment of lung cancer. Drug A is given to 500 people with early stage non-small cell lung cancer and a placebo is given to 450 people with the same condition. After 5 years 300 people who received drug A had survived compared to 225 who received the placebo. What is the number needed to treat to save one life?

- ☐ A. 3.33
- ☐ B. 75
- ☐ C. 10
- ☐ D. 5
- ☐ E. 2

$$\text{NNT} = 1 / \text{Absolute Risk Reduction}$$

The question asks about the number needed to treat to save one life. The 'event' is therefore survival.

Experimental (drug A) event rate = $300 / 500 = 0.6$

Control (placebo) event rate = $225 / 450 = 0.5$

Absolute risk reduction = $0.6 - 0.5 = 0.1$

Number needed to treat = $1 / 0.1 = 10$

Numbers needed to treat and absolute risk reduction

Numbers needed to treat (NNT) is a measure that indicates how many patients would require an

intervention to reduce the expected number of outcomes by one

It is calculated by $1/(\text{Absolute risk reduction})$ and is rounded to the next highest whole number

Experimental event rate (EER) = (Number who had particular outcome with the intervention) / (Total number who had the intervention)

Control event rate (CER) = (Number who had particular outcome with the control/ (Total number who had the control)

Absolute risk reduction = CER-EER or EER-CER?

The absolute risk reduction (ARR) may be calculated by finding the absolute difference between the control event rate (CER) and the experimental event rate (EER). You will often find both versions of the above listed in different sources. In some ways it doesn't matter which you use as you will end up with the same answer but from a technical point of view:

- if the outcome of the study is undesirable then $ARR = CER - EER$
- if the outcome of the study is desirable then $ARR^* = EER - CER$

*this may be more accurately termed absolute benefit increase, rather than absolute risk reduction

Question 83 of 174

The Framingham Heart Study is an example of a:

<input type="radio"/>	A. Cross-sectional survey
<input type="radio"/>	B. Cohort study
<input type="radio"/>	C. Case-control study
<input type="radio"/>	D. Randomised controlled trial
<input type="radio"/>	E. Meta-analysis

Study design

The following table highlights the main features of the main types of study:

Study type	Key features
Randomised controlled trial	<p>Participants randomly allocated to intervention or control group (e.g. standard treatment or placebo)</p> <p>Practical or ethical problems may limit use</p>
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Case-control study	<p>Observational and retrospective. Patients with a particular condition (cases) are identified and matched with controls. Data is then collected on past exposure to a possible causal agent for the condition.</p> <p>The usual outcome measure is the odds ratio.</p> <p>Inexpensive, produce quick results Useful for studying rare conditions Prone to confounding</p>
Cross-sectional survey	<p>Provide a 'snapshot', sometimes called prevalence studies</p> <p>Provide weak evidence of cause and effect</p>

Question 108 of 174

[Next](#)

You are asked to design a study to assess whether living near electricity pylons is a risk factor for childhood leukaemia. What is the most appropriate type of study design?

- ☐ A. Cross-over trial
- ☐ B. Cohort study
- ☐ C. Cross-sectional survey
- ☐ D. Case-control study
- ☐ E. Randomised controlled trial

As the outcome (childhood leukaemia) is relatively rare a cohort study would take an extremely long time to provide significant results

Study design

The following table highlights the main features of the main types of study:

Study type	Key features
Randomised controlled trial	<p>Participants randomly allocated to intervention or control group (e.g. standard treatment or placebo)</p> <p>Practical or ethical problems may limit use</p>
Cohort study	<p>Observational and prospective. Two (or more) are selected according to their exposure to a particular agent (e.g. medicine, toxin) and followed up to see how many develop a disease or other outcome.</p> <p>The usual outcome measure is the relative risk.</p> <p>Examples include Framingham Heart Study</p>
Case-control study	<p>Observational and retrospective. Patients with a particular condition (cases) are identified and matched with controls. Data is then collected on past exposure to a possible causal agent for the condition.</p> <p>The usual outcome measure is the odds ratio.</p>

Study type	Key features
	<p>Inexpensive, produce quick results</p> <p>Useful for studying rare conditions</p> <p>Prone to confounding</p>
<p>Cross-sectional survey</p>	<p>Provide a 'snapshot', sometimes called prevalence studies</p> <p>Provide weak evidence of cause and effect</p>

=====

Question 1 of 69

A 62-year-old man presents with insomnia and lethargy. He has no other systemic symptoms of note. Routine clinical examination reveals a palpable mass in the right lower quadrant of the abdomen, which doesn't move with respiration and is non-pulsatile. What is the most appropriate management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Blood screen including LFTs, U&Es |
| <input type="radio"/> | B. Urgent referral to local urological service |
| <input type="radio"/> | C. Ultrasound abdomen |
| <input checked="" type="radio"/> | D. Urgent referral to local colorectal service |
| <input type="radio"/> | E. Routine referral to general surgical clinic |

Colorectal cancer: referral guidelines

NICE recommend the following patients are referred urgently (i.e. within 2 weeks) to colorectal services for investigation:

- patients > 40 years old, reporting rectal bleeding with a change of bowel habit towards looser stools and/or increased stool frequency persisting for 6 weeks or more
- patients > 60 years old, with rectal bleeding persisting for 6 weeks or more without a change in bowel habit and without anal symptoms
- patients > 60 years old, with a change in bowel habit to looser stools and/or more frequent stools persisting for 6 weeks or more without rectal bleeding
- any patient presenting with a right lower abdominal mass consistent with involvement of the large bowel
- any patient with a palpable rectal mass
- unexplained iron deficiency anaemia in men or non-menstruating women (Hb < 11 g/dl in men, < 10 g/dl in women)

Question 2 of 69

The mother of a 2-month-old boy comes to surgery as she has noticed a soft lump in his right groin area. There is no antenatal or postnatal history of note. He is breast feeding well and is opening his bowels regularly. On examination you note a 1 cm swelling in the right inguinal region which is reducible and disappears on laying him flat. Scrotal examination is normal. What is the most appropriate action?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Refer to paediatric surgery |
| <input type="radio"/> | B. Refer to orthotics for fitting of a Pavlik harness |
| <input type="radio"/> | C. Reassure mother + ask her to return if not resolved by 6 months |
| <input type="radio"/> | D. Reassure mother + ask her to return if not resolved by 12 months |
| <input type="radio"/> | E. Reassure mother + ask her to return if not resolved by 2 years |

Congenital inguinal hernias have a high rate of complications and should be repaired promptly once identified.

Abdominal wall hernias

The classical surgical definition of a hernia is the protrusion of an organ or the fascia of an organ through the wall of the cavity that normally contains it.

Risk factors for abdominal wall hernias include:

- obesity
- ascites
- increasing age
- surgical wounds

Features

- palpable lump
- cough impulse
- pain
- obstruction: more common in femoral hernias

- strangulation: may compromise the bowel blood supply leading to infarction

Types of abdominal wall hernias:

Type of hernia	Details
Inguinal hernia	Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male; men have around a 25% lifetime risk of developing an inguinal hernia. Above and medial to pubic tubercle Strangulation is rare
Femoral hernia	Below and lateral to the pubic tubercle More common in women, particularly multiparous ones High risk of obstruction and strangulation Surgical repair is required
Umbilical hernia	Symmetrical bulge under the umbilicus
Paraumbilical hernia	Asymmetrical bulge - half the sac is covered by skin of the abdomen directly above or below the umbilicus
Epigastric hernia	Lump in the midline between umbilicus and the xiphisternum Most common in men aged 20-30 years
Incisional hernia	May occur in up to 10% of abdominal operations
Spigelian hernia	Also known as lateral ventral hernia Rare and seen in older patients A hernia through the spigelian fascia (the aponeurotic layer between the rectus abdominis muscle medially and the semilunar line laterally)
Obturator hernia	A hernia which passes through the obturator foramen. More common in females and typical presents with bowel obstruction
Richter hernia	A rare type of hernia where only the antimesenteric border of the bowel herniates through the fascial defect

Abdominal wall hernias in children:

Type of hernia	Details
Congenital inguinal hernia	Indirect hernias resulting from a patent processus vaginalis Occur in around 1% of term babies. More common in premature babies and boys 60% are right sided, 10% are bilaterally Should be surgically repaired soon after diagnosis as at risk of incarceration
Infantile umbilical hernia	Symmetrical bulge under the umbilicus More common in premature and Afro-Caribbean babies The vast majority resolve without intervention before the age of 4-5 years Complications are rare

Question 3 of 69

A 69-year-old man is started on tamsulosin for benign prostatic hyperplasia. Which one of the following best describes the side-effects he may experience?

- ☐ A. Urgency + insomnia
- ☒ B. Dizziness + postural hypotension
- ☐ C. Urinary retention + nausea
- ☐ D. Urgency + erectile dysfunction
- ☐ E. Erectile dysfunction + reduced libido

Benign prostatic hyperplasia

Benign prostatic hyperplasia (BPH) is a common condition seen in older men.

Risk factors

- age: around 50% of 50-year-old men will have evidence of BPH and 30% will have symptoms. Around 80% of 80-year-old men have evidence of BPH
- ethnicity: black > white > Asian

BPH typically presents with lower urinary tract symptoms (LUTS), which may be categorised into:

- voiding symptoms (obstructive): weak or intermittent urinary flow, straining, hesitancy, terminal dribbling and incomplete emptying
- storage symptoms (irritative) urgency, frequency, urgency incontinence and nocturia
- post-micturition: dribbling
- complications: urinary tract infection, retention, obstructive uropathy

Management options

- watchful waiting
- medication: alpha-1 antagonists, 5 alpha-reductase inhibitors. The use of combination therapy was supported by the Medical Therapy Of Prostatic Symptoms (MTOPS) trial
- surgery: transurethral resection of prostate (TURP)

Alpha-1 antagonists e.g. tamsulosin, alfuzosin

- decrease smooth muscle tone (prostate and bladder)
- considered first-line, improve symptoms in around 70% of men
- adverse effects: dizziness, postural hypotension, dry mouth, depression

5 alpha-reductase inhibitors e.g. finasteride

- block the conversion of testosterone to dihydrotestosterone (DHT), which is known to induce BPH
- unlike alpha-1 antagonists causes a reduction in prostate volume and hence may slow disease progression. This however takes time and symptoms may not improve for 6 months. They may also decrease PSA concentrations by up to 50%
- adverse effects: erectile dysfunction, reduced libido, ejaculation problems, gynaecomastia

Question 4 of 69

Which one of the following statements regarding inguinal hernias is **not** correct?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. There is no merit in differentiating between direct and indirect hernias prior to referral |
| <input checked="" type="radio"/> | B. Patients should be referred promptly due to the risk of strangulation |
| <input type="radio"/> | C. Symptoms are typically worse following exertion |
| <input type="radio"/> | D. 95% of patients are male |
| <input type="radio"/> | E. Are the most common cause of abdominal wall hernias |

Inguinal hernias rarely strangulate

Inguinal hernia

Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male; men have around a 25% lifetime risk of developing an inguinal hernia.

Features

- groin lump: disappears on pressure or when the patient lies down
- discomfort and ache: often worse with activity, severe pain is uncommon
- strangulation is rare

Whilst traditional textbooks describe the anatomical differences between indirect (hernia through the inguinal canal) and direct hernias (through the posterior wall of the inguinal canal) this is of no relevance to the clinical management.

Management

- the clinical consensus is currently to treat medically fit patients even if they are asymptomatic

- a hernia truss may be an option for patients not fit for surgery but probably has little role in other patients
- mesh repair is associated with the lowest recurrence rate

The Department for Work and Pensions recommend that following an open repair patients return to non-manual work after 2-3 weeks and following laparoscopic repair after 1-2 weeks

Complications

- early: bruising, wound infection
- late: chronic pain, recurrence

Question 5 of 69

Which one of the following is not an indication for circumcision?

- | | |
|----------------------------------|----------------------------------|
| <input type="radio"/> | A. Phimosis |
| <input type="radio"/> | B. Paraphimosis |
| <input type="radio"/> | C. Recurrent balanitis |
| <input type="radio"/> | D. Balanitis xerotica obliterans |
| <input checked="" type="radio"/> | E. Peyronie's disease |

Circumcision

Circumcision has been performed in a variety of cultures for thousands of years. Today it is mainly people of the Jewish and Islamic faith who undergo circumcision for religious/cultural reasons. Circumcision for religious or cultural reasons is not available on the NHS.

The medical benefits of routine circumcision remain controversial although some evidence has emerged that it:

- reduces the risk of penile cancer
- reduces the risk of UTI
- reduces the risk of acquiring sexually transmitted infections including HIV

Medical indications for circumcision

- phimosis
- recurrent balanitis
- balanitis xerotica obliterans
- paraphimosis

It is important to exclude hypospadias prior to circumcision as the foreskin may be used in surgical repair. Circumcision may be performed under a local or general anaesthetic.

Question 6-8 of 69

Theme: Abdominal pain

A.	Myocardial infarction
B.	Colorectal cancer
C.	Duodenal ulcer
D.	Gastric ulcer
E.	Biliary colic
F.	Ruptured abdominal aortic aneurysm
G.	Acute pancreatitis
H.	Toxic megacolon
I.	Diverticulitis
J.	Intestinal obstruction

For each one of the following scenarios please select the most likely diagnosis:

6. A 65-year-old man with a history of ischaemic heart disease presents with sudden onset central abdominal pain radiating to his back. He is clammy and short of breath.

You answered Myocardial infarction

The correct answer is Ruptured abdominal aortic aneurysm

7. A 34-year-old man who drinks 21 units of alcohol per week presents with episodic epigastric pain that is relieved by eating.

You answered Colorectal cancer

The correct answer is Duodenal ulcer

8. A 40-year-old woman with a history of Crohn's disease presents with abdominal pain and distension. She describes constipation for the past 4 days.

You answered Duodenal ulcer

The correct answer is Intestinal obstruction

Abdominal pain

The table below gives characteristic exam question features for conditions causing abdominal pain. Unusual and 'medical' causes of abdominal pain should also be remembered:

- myocardial infarction
- diabetic ketoacidosis
- pneumonia
- acute intermittent porphyria
- lead poisoning

Condition	Characteristic exam feature
Peptic ulcer disease	Duodenal ulcers: more common than gastric ulcers, epigastric pain relieved by eating Gastric ulcers: epigastric pain worsened by eating Features of upper gastrointestinal haemorrhage may be seen (haematemesis, melena etc)
Appendicitis	Pain initial in the central abdomen before localising to the right iliac fossa Anorexia is common Tachycardia, low-grade pyrexia, tenderness in RIF Rovsing's sign: more pain in RIF than LIF when palpating LIF
Acute pancreatitis	Usually due to alcohol or gallstones Severe epigastric pain Vomiting is common Examination may reveal tenderness, ileus and low-grade fever Periumbilical discolouration (Cullen's sign) and flank discolouration (Grey-Turner's sign) is described but rare
Biliary colic	Pain in the RUQ radiating to the back and interscapular region, may be following a fatty meal. Slight misnomer as the pain may persist for hours Obstructive jaundice may cause pale stools and dark urine It is sometimes taught that patients are female, forties, fat and fair although this is obviously a generalisation
Acute cholecystitis	History of gallstones symptoms (see above) Continuous RUQ pain Fever, raised inflammatory markers and white cells Murphy's sign positive (arrest of inspiration on palpation of the RUQ)
Diverticulitis	Colicky pain typically in the LLQ Fever, raised inflammatory markers and white cells
Abdominal aortic aneurysm	Severe central abdominal pain radiating to the back Presentation may be catastrophic (e.g. Sudden collapse) or sub-acute (persistent severe central abdominal pain with developing shock) Patients may have a history of cardiovascular disease
Intestinal obstruction	History of malignancy/previous operations Vomiting Not opened bowels recently 'Tinkling' bowel sounds

Question 9 of 69

Which one of the following may be used to monitor patients with colorectal cancer?

- | | |
|----------------------------------|-----------------------------|
| <input type="radio"/> | A. CA-125 |
| <input checked="" type="radio"/> | B. Carcinoembryonic antigen |
| <input type="radio"/> | C. Alpha-fetoprotein |
| <input type="radio"/> | D. CA 19-9 |
| <input type="radio"/> | E. CA 15-3 |

Carcinoembryonic antigen may be used to monitor for recurrence in patients post-operatively or to assess response to treatment in patients with metastatic disease

Colorectal cancer: screening

Overview

- most cancers develop from adenomatous polyps. Screening for colorectal cancer has been shown to reduce mortality by 16%
- the NHS now has a national screening programme offering screening every 2 years to all men and women aged 60 to 69 years. Patients aged over 70 years may request screening
- eligible patients are sent faecal occult blood (FOB) tests through the post
- patients with abnormal results are offered a colonoscopy

At colonoscopy, approximately:

- 5 out of 10 patients will have a normal exam
- 4 out of 10 patients will be found to have polyps which may be removed due to their premalignant potential
- 1 out of 10 patients will be found to have cancer

Question 10 of 69

A 24-year-old man presents with rectal bleeding and a 'sharp, stinging' pain on defecation. This has been present for the past two weeks. He has a tendency towards constipation and notices that when he wipes himself fresh blood is often on the paper. Rectal examination is limited due to pain but no external abnormalities are seen. What is the most likely diagnosis?

- | | |
|----------------------------------|--------------------------|
| <input type="radio"/> | A. Internal haemorrhoids |
| <input type="radio"/> | B. Anal carcinoma |
| <input type="radio"/> | C. Rectal polyp |
| <input type="radio"/> | D. Anogenital herpes |
| <input checked="" type="radio"/> | E. Anal fissure |

The combination of pain and bleeding is very characteristic of anal fissures. Pain is a feature of thrombosed external haemorrhoids but is unusual with internal haemorrhoids. Superficial anal fissures may be difficult to see on examination.

Anal fissure

Anal fissures are longitudinal or elliptical tears of the squamous lining of the distal anal canal. If present for less than 6 weeks they are defined as acute, and chronic if present for more than 6 weeks. Around 90% of anal fissures occur on the posterior midline

Management of an acute anal fissure (< 6 weeks)

- dietary advice: high-fibre diet with high fluid intake
- bulk-forming laxatives are first line - if not tolerated then lactulose should be tried
- lubricants such as petroleum jelly may be tried before defecation
- topical anaesthetics

-analgesia

- topical steroids do not provide significant relief

Management of a chronic anal fissure (> 6 weeks)

- the above techniques should be continued
- topical glyceryl trinitrate (GTN) is first line treatment for a chronic anal fissure
- if topical GTN is not effective after 8 weeks then secondary referral should be considered for surgery or botulinum toxin

Question 11-13 of 69

Theme: Breast disorders

- A. Lipoma
- B. Paget's disease of the breast
- C. Breast cancer
- D. Sebaceous cysts
- E. Fibroadenoma
- F. Fibroadenosis
- G. Duct papilloma
- H. Breast abscess
- I. Fat necrosis
- J. Mammary duct ectasia

For each one of the following please select the most appropriate answer:

11. A 72-year-old woman complains of 'eczema' on her left nipple. On examination the areola is erythematous and thickened.

You answered Lipoma

The correct answer is Paget's disease of the breast

12. A 26-year-old woman has noticed a discrete, non-tender lump which is highly mobile on examination.

You answered Paget's disease of the breast

The correct answer is Fibroadenoma

13. A 35-year-old woman complains of 'lumpy' breasts. Her symptoms are worse in the premenstrual period.

You answered Breast cancer

The correct answer is Fibroadenosis

Breast disorders

The table below describes some of the features seen in the most common breast disorders:

Disorder	Features
Fibroadenoma	Common in women under the age of 30 years Often described as 'breast mice' due as they are discrete, non-tender, highly mobile lumps
Fibroadenosis (fibrocystic disease, benign mammary dysplasia)	Most common in middle-aged women 'Lumpy' breasts which may be painful. Symptoms may worsen prior to menstruation
Breast cancer	Characteristically a hard, irregular lump. There may be associated nipple inversion or skin tethering Paget's disease of the breast - intraductal carcinoma associated with a reddening and thickening (may resemble eczematous changes) of the skin/areola
Mammary duct ectasia	Dilatation of the large breast ducts Most common around the menopause May present with a tender lump around the areola +/- a green nipple discharge If ruptures may cause local inflammation, sometimes referred to as 'plasma cell mastitis'
Duct papilloma	Local areas of epithelial proliferation in large mammary ducts Hyperplastic lesions rather than malignant or premalignant

Disorder	Features
	May present with blood stained discharge
Fat necrosis	<p>More common in obese women with large breasts</p> <p>May follow trivial or unnoticed trauma</p> <p>Initial inflammatory response, the lesion is typical firm and round but may develop into a hard, irregular breast lump</p> <p>Rare and may mimic breast cancer so further investigation is always warranted</p>
Breast abscess	<p>More common in lactating women</p> <p>Red, hot tender swelling</p>

Lipomas and sebaceous cysts may also develop around the breast tissue.

Question 14 of 69

Which one of the following clinical features would not warrant an urgent referral (i.e. within 2 weeks) to local colorectal services?

- ☐ A. Unexplained iron-deficiency anaemia in a 50-year-old male
- ☐ B. 62-year-old female with a 3 month history of rectal bleeding
- ☐ C. Palpable rectal mass in a 36-year-old female
- ☐ D. 48-year-old female with a 8 week history of rectal bleeding and increased stool frequency
- ☒ E. 65-year-old man with new onset constipation lasting 8 weeks

Colorectal cancer fast-track - diarrhoea is more significant than constipation

If the 65-year-old man's symptoms persist he may still require lower gastrointestinal investigations, but he does not meet the fast-track criteria.

Colorectal cancer: referral guidelines

NICE recommend the following patients are referred urgently (i.e. within 2 weeks) to colorectal services for investigation:

- patients > 40 years old, reporting rectal bleeding with a change of bowel habit towards looser stools and/or increased stool frequency persisting for 6 weeks or more
- patients > 60 years old, with rectal bleeding persisting for 6 weeks or more without a change in bowel habit and without anal symptoms
- patients > 60 years old, with a change in bowel habit to looser stools and/or more frequent stools persisting for 6 weeks or more without rectal bleeding
- any patient presenting with a right lower abdominal mass consistent with involvement of the large bowel
- any patient with a palpable rectal mass
- unexplained iron deficiency anaemia in men or non-menstruating women (Hb < 11 g/dl in men, < 10 g/dl in women)

Question 15 of 69

Which one of the following is most associated with male infertility?

- | | |
|----------------------------------|---------------------------------|
| <input type="radio"/> | A. Sodium valproate therapy |
| <input type="radio"/> | B. Benign prostatic hyperplasia |
| <input checked="" type="radio"/> | C. Varicoceles |
| <input type="radio"/> | D. Epididymal cysts |
| <input type="radio"/> | E. Hydroceles |

Varicoceles may be associated with infertility

Scrotal problems

Epididymal cysts

Epididymal cysts are the most common cause of scrotal swellings seen in primary care.

Features

- separate from the body of the testicle
- found posterior to the testicle

Associated conditions

- polycystic kidney disease
- cystic fibrosis
- von Hippel-Lindau syndrome

Diagnosis may be confirmed by ultrasound.

Management is usually supportive but surgical removal or sclerotherapy may be attempted for larger or symptomatic cysts.

Hydrocele

A hydrocele describes the accumulation of fluid within the tunica vaginalis. They can be divided into communicating and non-communicating:

- communicating: caused by patency of the processus vaginalis allowing peritoneal fluid to drain down into the scrotum. Communicating hydroceles are common in newborn males (clinically apparent in 5-10%) and usually resolve within the first few months of life
- non-communicating: caused by excessive fluid production within the tunica vaginalis

Hydroceles may develop secondary to:

- epididymo-orchitis
- testicular torsion
- testicular tumours

Features

- soft, non-tender swelling of the hemi-scrotum. Usually anterior to and below the testicle
- the swelling is confined to the scrotum, you can get 'above' the mass on examination
- transilluminates with a pen torch
- the testis may be difficult to palpate if the hydrocele is large

Diagnosis may be clinical but ultrasound is required if there is any doubt about the diagnosis or if the underlying testis cannot be palpated.

Management

- infantile hydroceles are generally repaired if they do not resolve spontaneously by the age of 1-2 years
- in adults a conservative approach may be taken depending on the severity of the presentation. Further investigation (e.g. ultrasound) is usually warranted however to exclude any underlying cause such as a tumour

Varicocele

A varicocele is an abnormal enlargement of the testicular veins. They are usually asymptomatic but may be important as they are associated with infertility.

Varicoceles are much more common on the left side (> 80%). Features:

- classically described as a 'bag of worms'
- subfertility

Diagnosis

- ultrasound with Doppler studies

Management


- usually conservative
- occasionally surgery is required if the patient is troubled by pain. There is ongoing debate regarding the effectiveness of surgery to treat infertility

Question 16 of 69

A 62-year-old man presents with nocturia, hesitancy and terminal dribbling. Prostate examination reveals a moderately enlarged prostate with no irregular features and a well defined median sulcus. Blood tests show:

PSA 1.3 ng/ml

What is the most appropriate management?

-  ☒ **A.** Alpha-1 antagonist
- ☐ **B.** 5 alpha-reductase inhibitor
- ☐ **C.** Non-urgent referral for transurethral resection of prostate
- ☐ **D.** Empirical treatment with ciprofloxacin for 2 weeks
- ☐ **E.** Urgent referral to urology

Alpha-1 antagonists are first-line in patients with benign prostatic hyperplasia

Benign prostatic hyperplasia

Benign prostatic hyperplasia (BPH) is a common condition seen in older men.

Risk factors

- age: around 50% of 50-year-old men will have evidence of BPH and 30% will have symptoms. Around 80% of 80-year-old men have evidence of BPH

- ethnicity: black > white > Asian

BPH typically presents with lower urinary tract symptoms (LUTS), which may be categorised into:

- voiding symptoms (obstructive): weak or intermittent urinary flow, straining, hesitancy, terminal dribbling and incomplete emptying
- storage symptoms (irritative) urgency, frequency, urgency incontinence and nocturia
- post-micturition: dribbling
- complications: urinary tract infection, retention, obstructive uropathy

Management options

- watchful waiting
- medication: alpha-1 antagonists, 5 alpha-reductase inhibitors. The use of combination therapy was supported by the Medical Therapy Of Prostatic Symptoms (MTOPS) trial
- surgery: transurethral resection of prostate (TURP)

Alpha-1 antagonists e.g. tamsulosin, alfuzosin

- decrease smooth muscle tone (prostate and bladder)
- considered first-line, improve symptoms in around 70% of men
- adverse effects: dizziness, postural hypotension, dry mouth, depression

5 alpha-reductase inhibitors e.g. finasteride

- block the conversion of testosterone to dihydrotestosterone (DHT), which is known to induce BPH
- unlike alpha-1 antagonists causes a reduction in prostate volume and hence may slow disease progression. This however takes time and symptoms may not improve for 6 months. They may also decrease PSA concentrations by up to 50%
- adverse effects: erectile dysfunction, reduced libido, ejaculation problems, gynaecomastia

Question 17 of 69

Which one of the following types of suture is absorbable?

- ☐ A. Ethilon
- ☒ B. Vicryl
- ☐ C. Novafil
- ☐ D. Prolene
- ☐ E. Silk

Minor surgery

Local anaesthetic (LA)

Lidocaine is the most widely used LA. It has a rapid onset of action and anaesthesia lasts for around 1 hour.

- the maximum safe dose is 3mg/kg. The BNF states 200mg (or 500mg if given in solutions containing adrenaline), which equates to 3mg/kg for a 66kg patient. This is the equivalent of 20ml of 1% solution or 10ml of 2% solution
- lidocaine is available pre-mixed with adrenaline. This increases the duration of action of lidocaine and reduces blood loss secondary to vasoconstriction. It must never be used near extremities due to the risk of ischaemia

Suture material

Non-absorbable	Absorbable
Silk Novafil Prolene Ethilon	Vicryl Dexon PDS

Non-absorbable sutures are normally removed after 7-14 days, depending on the location.

Absorbable sutures normally disappear after 7-10 days. Removal times for non-absorbable sutures are shown below:

Area	Removal time (days)
Face	3 - 5
Scalp, limbs, chest	7 - 10
Hand, foot, back	10 - 14

Question 18 of 69

A 62-year-old man with no significant past medical history presents with a right sided groin lump which he noticed whilst having a shower. It has been present for 2 weeks and disappears when he lies down. It never causes him any discomfort and there are no other gastrointestinal symptoms of note. Examination reveals a small reducible swelling in the right groin. What is the most appropriate management?

- ☐ A. Refer for fitting of a truss
- ☐ B. Refer to vascular surgeon
- ☒ C. Routine referral for surgical repair
- ☐ D. Advise no action as it will probably improve with time
- ☐ E. Fast-track referral to colorectal service

Next question

This patient has an asymptomatic inguinal hernia. Studies looking at conservative management tend to find that many patients become symptomatic and eventually have surgery anyway. As this patient is medically fit most clinicians would refer for surgical repair.

Inguinal hernias do not resolve spontaneously.

A number of PCTs have begun to put asymptomatic inguinal hernias on the 'low clinical priority' list. Whilst this may be reasonable for older patients who are 'not bothered' by their condition it is debatable how feasible such a blanket policy is for all patients.

Inguinal hernia

Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male; men have around a 25% lifetime risk of developing an inguinal hernia.

Features

- groin lump: disappears on pressure or when the patient lies down
- discomfort and ache: often worse with activity, severe pain is uncommon
- strangulation is rare

Whilst traditional textbooks describe the anatomical differences between indirect (hernia through the inguinal canal) and direct hernias (through the posterior wall of the inguinal canal) this is of no relevance to the clinical management.

Management

- the clinical consensus is currently to treat medically fit patients even if they are asymptomatic
- a hernia truss may be an option for patients not fit for surgery but probably has little role in other patients
- mesh repair is associated with the lowest recurrence rate

The Department for Work and Pensions recommend that following an open repair patients return to non-manual work after 2-3 weeks and following laparoscopic repair after 1-2 weeks

Complications

- early: bruising, wound infection
- late: chronic pain, recurrence

Question 19 of 69

A 30-year-old man presents with a painless lump in his right testicle. Which one of the following is most strongly associated with testicular cancer?

- ☐ A. Increasing age
- ☐ B. Smoking
- ☒ C. Infertility
- ☐ D. High maternal age
- ☐ E. High paternal age

Testicular cancer

Testicular cancer is the most common malignancy in men aged 20-30 years. Around 95% of cases of testicular cancer are germ-cell tumours. Germ cell tumours may essentially be divided into:

- seminomas
- teratomas

Other type of germ cell tumours include yolk sac tumours. Non-germ cell tumours include Leydig cell tumours and sarcomas.

The peak incidence for teratomas is 25 years and seminomas is 35 years. Risk factors include:

- cryptorchidism
- infertility
- family history
- Klinefelter's syndrome
- mumps orchitis

Features

- a painless lump is the most common presenting symptom
- pain may also be present in a minority of men
- other possible features include hydrocele, gynaecomastia

Diagnosis

- ultrasound is first-line

Management

- orchidectomy
- chemotherapy and radiotherapy may be given depending on staging

Prognosis is generally excellent

- 5 year survival for seminomas is around 95% if Stage I
- 5 year survival for teratomas is around 85% if Stage I

Question 20 of 69

A 37-year-old man with a history of internal haemorrhoids presents as his symptoms have recently flared. He now describes piles which he has to manually reduce following defecation. What grade of haemorrhoids does he have?

<input type="radio"/>	A. Grading system does not apply to internal haemorrhoids
<input type="radio"/>	B. Grade I
<input type="radio"/>	C. Grade II
<input checked="" type="radio"/>	D. Grade III
<input type="radio"/>	E. Grade IV

Haemorrhoids

Haemorrhoidal tissue is part of the normal anatomy which contributes to anal continence. These mucosal vascular cushions are found in the left lateral, right posterior and right anterior portions of the anal canal (3 o'clock, 7 o'clock and 11 o'clock respectively). Haemorrhoids are said to exist when they become enlarged, congested and symptomatic

Clinical features

- painless rectal bleeding is the most common symptom
- pruritus
- pain: usually not significant unless piles are thrombosed
- soiling may occur with third or fourth degree piles

Types of haemorrhoids

External

- originate below the dentate line
- prone to thrombosis, may be painful

Internal

- originate above the dentate line
- do not generally cause pain

Grading of internal haemorrhoids

Grade I	Do not prolapse out of the anal canal
Grade II	Prolapse on defecation but reduce spontaneously
Grade III	Can be manually reduced
Grade IV	Cannot be reduced

Management

- soften stools: increase dietary fibre and fluid intake
- topical local anaesthetics and steroids may be used to help symptoms
- outpatient treatments: rubber band ligation is superior to injection sclerotherapy
- surgery is reserved for large symptomatic haemorrhoids which do not respond to outpatient treatments
- newer treatments: Doppler guided haemorrhoidal artery ligation, stapled haemorrhoidopexy

Acutely thrombosed external haemorrhoids

- typically present with significant pain
- examination reveals a purplish, oedematous, tender subcutaneous perianal mass
- if patient presents within 72 hours then referral should be considered for excision. Otherwise patients can usually be managed with stool softeners, ice packs and analgesia. Symptoms usually settle within 10 days

Question 21 of 69

Which one of the following statements regarding hydroceles is correct?



- | | |
|----------------------------------|---|
| <input checked="" type="radio"/> | A. Communicating hydroceles are found in more than 3% of newborn males |
| <input type="radio"/> | B. The vast majority occur on the right hand side |
| <input type="radio"/> | C. In younger children are often secondary to a varicocele |
| <input type="radio"/> | D. With hydroceles you usually cannot get above the swelling on examination |
| <input type="radio"/> | E. Are associated with infertility |

Scrotal problems

Epididymal cysts

Epididymal cysts are the most common cause of scrotal swellings seen in primary care.

Features

- separate from the body of the testicle
- found posterior to the testicle

Associated conditions

- polycystic kidney disease
- cystic fibrosis
- von Hippel-Lindau syndrome

Diagnosis may be confirmed by ultrasound.

Management is usually supportive but surgical removal or sclerotherapy may be attempted for larger or symptomatic cysts.

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- communicating: caused by patency of the processus vaginalis allowing peritoneal fluid to drain down into the scrotum. Communicating hydroceles are common in newborn males (clinically apparent in 5-10%) and usually resolve within the first few months of life
- non-communicating: caused by excessive fluid production within the tunica vaginalis

Hydroceles may develop secondary to:

- epididymo-orchitis
- testicular torsion
- testicular tumours

Features

- soft, non-tender swelling of the hemi-scrotum. Usually anterior to and below the testicle
- the swelling is confined to the scrotum, you can get 'above' the mass on examination
- transilluminates with a pen torch
- the testis may be difficult to palpate if the hydrocele is large

Diagnosis may be clinical but ultrasound is required if there is any doubt about the diagnosis or if the underlying testis cannot be palpated.

Management

- infantile hydroceles are generally repaired if they do not resolve spontaneously by the age of 1-2 years
- in adults a conservative approach may be taken depending on the severity of the presentation. Further investigation (e.g. ultrasound) is usually warranted however to exclude any underlying cause such as a tumour

Varicocele

A varicocele is an abnormal enlargement of the testicular veins. They are usually asymptomatic but may be important as they are associated with infertility.

Varicoceles are much more common on the left side (> 80%). Features:

- classically described as a 'bag of worms'
- subfertility

Diagnosis

- ultrasound with Doppler studies

Management

- usually conservative
- occasionally surgery is required if the patient is troubled by pain. There is ongoing debate regarding the effectiveness of surgery to treat infertility

Question 22 of 69

A 53-year-old man who has no past history of note requests a PSA test. One of his father's friends has recently been diagnosed with prostate cancer. What is the most appropriate action?

- ☐ A. Perform a digital rectal examination and refer him to urology so he can be counselled regarding the PSA test
- ☐ B. Tell him that you can appreciate his concern but reassure that at his age he is at very low risk
- ☐ C. Advise him that a national screening programme was started in 2009 and he will be called at the age of 60 years for a test
- ☒ D. Give him a patient information leaflet with details of the PSA test and allow him to make the choice
- ☐ E. Offer to perform a digital rectal examination but advise him that the PSA test is not recommended in younger asymptomatic men

Prostate cancer: PSA testing

Prostate specific antigen (PSA) is a serine protease enzyme produced by normal and malignant prostate epithelial cells. It has become an important tumour marker but much controversy still exists regarding its usefulness as a screening tool.

The NHS Prostate Cancer Risk Management Programme (PCRMP) has published updated guidelines in 2009 on how to handle requests for PSA testing in asymptomatic men. A recent European trial (ERSPC) showed a statistically significant reduction in the rate of death prostate cancer by 20% in men aged 55 to 69 years but this was associated with a high risk of over-diagnosis and over-treatment. Having reviewed this and other data the National Screening Committee have decided not to introduce a prostate cancer screening programme yet but rather allow men to make an informed choice.

Age-adjusted upper limits for PSA were recommended by the PCRMP:

Age	PSA level (ng/ml)
50-59 years	3.0
60-69 years	4.0
> 70 years	5.0

PSA levels may also be raised by*:

- benign prostatic hyperplasia (BPH)
- prostatitis and urinary tract infection (NICE recommend to postpone the PSA test for at least 1 month after treatment)
- ejaculation (ideally not in the previous 48 hours)
- vigorous exercise (ideally not in the previous 48 hours)
- urinary retention
- instrumentation of the urinary tract

Poor specificity and sensitivity

- around 33% of men with a PSA of 4-10 ng/ml will be found to have prostate cancer. With a PSA of 10-20 ng/ml this rises to 60% of men
- around 20% with prostate cancer have a normal PSA
- various methods are used to try and add greater meaning to a PSA level including age-adjusted upper limits and monitoring change in PSA level with time (PSA velocity or PSA doubling time)

*whether digital rectal examination actually causes a rise in PSA levels is a matter of debate

Question 23 of 69

Which one of the following scenarios would not warrant an urgent referral to the local breast service according to NICE guidelines?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. 25-year-old female with a 6 week history of a new breast lump. Family history of breast cancer. Benign in nature on examination |
| <input type="radio"/> | B. 34-year-old female with a 6 week history of a new breast lump. Benign in nature on examination |
| <input type="radio"/> | C. 55-year-old female with new breast lump. Benign in nature on examination |
| <input checked="" type="radio"/> | D. 28-year-old female with a 8 week history of a new breast lump. Benign in nature on examination |
| <input type="radio"/> | E. 29-year-old female with a unilateral bloody nipple discharge |

NICE guidelines suggest a cut-off age of 30 years for a breast lump without features suggestive of cancer, but which persists after the next period. As this 28-year-old is below this cut-off she should be referred non-urgently to the local breast services. The 25-year-old should be fast-tracked as she has a family history of breast cancer.

Breast cancer: referral

NICE published referral guidelines for suspected breast cancer in 2005

Urgent referrals (i.e. within 2 weeks)

- any breast lump with features suggestive of cancer (hard, tethered etc)
- any breast lump in a post-menopausal woman, regardless of features suggestive of cancer
- any breast lump in a women more than 30 years old without features suggestive of cancer but which persists after her next period
- if there is past history of breast cancer any breast lump should warrant urgent referral
- spontaneous unilateral bloody nipple discharge
- unilateral eczematous skin or nipple change that does not respond to topical treatment, or with nipple distortion of recent onset

Non-urgent referrals

- women < 30 years old who present with a breast lump with no features suggestive of cancer, no relevant family history and no change in the size of the lump

Question 24-26 of 69

Theme: Abdominal swelling

- | |
|-----------------------------|
| A. Irritable bowel syndrome |
| B. Endometrial cancer |
| C. Ovarian cancer |
| D. Pregnancy |
| E. Intestinal obstruction |
| F. Urinary retention |
| G. Ascites |
| H. Gastric cancer |
| I. Colorectal cancer |
| J. Bladder cancer |

For each one of the following scenarios select the most likely diagnosis:

24. 62-year-old woman with a 3 month history of urinary symptoms, early satiety and a raised CA125

✓ Ovarian cancer

Ovarian cancer tends to present late due to non-specific symptoms

25. 26-year-old female with a history of constipation, episodic abdominal pain and bloating.

✓ Irritable bowel syndrome

These are classic symptoms of irritable bowel syndrome

26. 72-year-old woman with a history of congestive cardiac failure. She reports having a poor appetite and feeling bloated. She is admitted frequently to hospital with left ventricular failure due to poor compliance with medication

✓ Ascites

Patients with poorly controlled heart failure may develop 'cardiac cachexia', partly due to gut oedema

Abdominal swelling

The table below gives characteristic exam question features for conditions causing abdominal swelling

Condition	Characteristic exam feature
Pregnancy	Young female Amenorrhoea
Intestinal obstruction	History of malignancy/previous operations Vomiting Not opened bowels recently 'Tinkling' bowel sounds
Ascites	History of alcohol excess, cardiac failure
Urinary retention	History of prostate problems Dullness to percussion around suprapubic area
Ovarian cancer	Older female Pelvic pain Urinary symptoms e.g. urgency Raised CA125 Early satiety, bloating

Question 27 of 69

A 45-year woman who you have treated for obesity comes for review. Despite ongoing lifestyle interventions and trials of orlistat and sibutramine she has failed to lose a significant amount of weight. She is currently taking ramipril for hypertension but a recent fasting glucose was normal. For this patient, what is the cut-off body mass index (BMI) that would trigger a referral for consideration of bariatric surgery?



- | | |
|----------------------------------|-------------------------------|
| <input checked="" type="radio"/> | A. BMI > 35 kg/m ² |
| <input type="radio"/> | B. BMI > 40 kg/m ² |
| <input type="radio"/> | C. BMI > 30 kg/m ² |
| <input type="radio"/> | D. BMI > 38 kg/m ² |
| <input type="radio"/> | E. BMI > 45 kg/m ² |

Obesity - NICE bariatric referral cut-offs

- with risk factors (T2DM, BP etc): > 35 kg/m²
- no risk factors: > 40 kg/m²

Obesity: bariatric surgery

The use of bariatric surgery in the management of obesity has developed significantly over the past decade. It is now recognised that for many obese patients who fail to lose weight with lifestyle and drug interventions the risks and expense of long-term obesity outweigh those of surgery.

NICE guidelines on bariatric surgery for adults

Consider surgery for people with severe obesity if:

- they have a BMI of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² and other significant disease (for example, type 2 diabetes mellitus, hypertension) that could be improved if they lost weight
- all appropriate non-surgical measures have failed to achieve or maintain adequate clinically beneficial weight loss for at least 6 months
- they are receiving or will receive intensive specialist management
- they are generally fit for anaesthesia and surgery
- they commit to the need for long-term follow-up

Consider surgery as a first-line option for adults with a BMI of more than 50 kg/m² in whom surgical intervention is considered appropriate; consider orlistat before surgery if the waiting time is long

Types of bariatric surgery:

- primarily restrictive: laparoscopic-adjustable gastric banding (LAGB) or sleeve gastrectomy
- primarily malabsorptive: classic biliopancreatic diversion (BPD) has now largely been replaced by biliopancreatic diversion with duodenal switch
- mixed: Roux-en-Y gastric bypass surgery

Which operation?

- LAGB produces less weight loss than malabsorptive or mixed procedures but as it has fewer complications it is normally the first-line intervention in patients with a BMI of 30-39kg/m²
- patients with a BMI > 40 kg/m² may be considered for a gastric bypass or sleeve gastrectomy. The latter may be done as a sole procedure or as an initial procedure prior to bypass
- primarily malabsorptive procedures are usually reserved for very obese patients (e.g. BMI > 60 kg/m²)

Question 28 of 69

Which one of the following ethnic groups have an increased incidence of prostate cancer?

- ✓ ☒ A. Afro-Caribbean
- ☐ B. Ashkenazi Jews
- ☐ C. Chinese
- ☐ D. Indian subcontinent
- ☐ E. White

Prostate cancer - more common in the Afro-Caribbean population

Prostate cancer: features

Prostate cancer is now the most common cancer in adult males in the UK and is the second most common cause of death due to cancer in men after lung cancer.

Risk factors

- increasing age
- obesity
- Afro-Caribbean ethnicity
- family history: around 5-10% of cases have a strong family history

Localised prostate cancer is often asymptomatic. This is partly because cancers tend to develop in the periphery of the prostate and hence don't cause obstructive symptoms early on. Possible features include:

- bladder outlet obstruction: hesitancy, urinary retention
- haematuria, haemospermia
- pain: back, perineal or testicular

- digital rectal examination: asymmetrical, hard, nodular enlargement with loss of median sulcus

Question 29 of 69

A 24-year-old man presents due to severe pain when defecating for the past 2 weeks. He has occasionally noted some blood on the toilet paper when wiping himself. On examination a tear is seen on the posterior midline of the anal verge. Which one of the following should not be recommended as a treatment option?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Bulk-forming laxatives |
| <input type="radio"/> | B. Application of lubricant prior to defecation |
| <input checked="" type="radio"/> | C. Topical steroids |
| <input type="radio"/> | D. Dietary advice |
| <input type="radio"/> | E. Paracetamol |

Topical steroids have been shown in studies to be of little benefit in treating anal fissures

Anal fissure

Anal fissures are longitudinal or elliptical tears of the squamous lining of the distal anal canal. If present for less than 6 weeks they are defined as acute, and chronic if present for more than 6 weeks. Around 90% of anal fissures occur on the posterior midline

Management of an acute anal fissure (< 6 weeks)

- dietary advice: high-fibre diet with high fluid intake
- bulk-forming laxatives are first line - if not tolerated then lactulose should be tried
- lubricants such as petroleum jelly may be tried before defecation
- topical anaesthetics

-analgesia

- topical steroids do not provide significant relief

Management of a chronic anal fissure (> 6 weeks)

- the above techniques should be continued
- topical glyceryl trinitrate (GTN) is first line treatment for a chronic anal fissure
- if topical GTN is not effective after 8 weeks then secondary referral should be considered for surgery or botulinum toxin

Question 30-32 of 69

Theme: Abdominal pain

- | | |
|-----------|-----------------------------------|
| A. | Alcoholic hepatitis |
| B. | Acute cholecystitis |
| C. | Duodenal ulcer |
| D. | Gastric ulcer |
| E. | Biliary colic |
| F. | Ruptured abdominal acute aneurysm |
| G. | Acute pancreatitis |
| H. | Gastroenteritis |
| I. | Diverticulitis |
| J. | Intestinal obstruction |

For each one of the following scenarios please select the most likely diagnosis:

- 30.** A 49-year-old woman presents with pain in the right upper quadrant. This has been occurring for the past 3 months and is often precipitated by a heavy meal. When the pain comes it is typically lasts around 1-2 hours. Clinical examination is unremarkable other than mild tenderness in the right upper quadrant.

The correct answer is Biliary colic

31. A 37-year-old attends surgery due to a one day history of severe central abdominal pain radiating through to the back. He has vomited several times and is guarding on examination. Parotitis and spider naevi are also noted.

The correct answer is Acute pancreatitis

Parotitis and spider naevi suggest excessive alcohol intake which is one of the most common causes of acute pancreatitis.

32. A 72-year-old woman who takes regular laxatives comes to surgery. Over the past two days she has developed progressively worse pain in the left lower quadrant. On examination she has a low-grade pyrexia and is tender on the left side of the abdomen

The correct answer is Diverticulitis

Abdominal pain

The table below gives characteristic exam question features for conditions causing abdominal pain. Unusual and 'medical' causes of abdominal pain should also be remembered:

- myocardial infarction
- diabetic ketoacidosis
- pneumonia
- acute intermittent porphyria
- lead poisoning

Condition	Characteristic exam feature
Peptic ulcer disease	Duodenal ulcers: more common than gastric ulcers, epigastric pain relieved by eating Gastric ulcers: epigastric pain worsened by eating

Condition	Characteristic exam feature
	Features of upper gastrointestinal haemorrhage may be seen (haematemesis, melena etc)
Appendicitis	Pain initial in the central abdomen before localising to the right iliac fossa Anorexia is common Tachycardia, low-grade pyrexia, tenderness in RIF Rovsing's sign: more pain in RIF than LIF when palpating LIF
Acute pancreatitis	Usually due to alcohol or gallstones Severe epigastric pain Vomiting is common Examination may reveal tenderness, ileus and low-grade fever Periumbilical discolouration (Cullen's sign) and flank discolouration (Grey-Turner's sign) is described but rare
Biliary colic	Pain in the RUQ radiating to the back and interscapular region, may be following a fatty meal. Slight misnomer as the pain may persist for hours Obstructive jaundice may cause pale stools and dark urine It is sometimes taught that patients are female, forties, fat and fair although this is obviously a generalisation
Acute cholecystitis	History of gallstones symptoms (see above) Continuous RUQ pain Fever, raised inflammatory markers and white cells Murphy's sign positive (arrest of inspiration on palpation of the RUQ)
Diverticulitis	Colicky pain typically in the LLQ Fever, raised inflammatory markers and white cells
Abdominal aortic aneurysm	Severe central abdominal pain radiating to the back Presentation may be catastrophic (e.g. Sudden collapse) or sub-acute (persistent severe central abdominal pain with developing shock) Patients may have a history of cardiovascular disease
Intestinal obstruction	History of malignancy/previous operations Vomiting Not opened bowels recently 'Tinkling' bowel sounds

Question 33 of 69

A patient is started on finasteride for the treatment of benign prostatic hyperplasia. How long should the patient be told that treatment may take to be effective?

- ☐ A. Within 8 hours of taking the tablet
- ☐ B. Within 3 days
- ☐ C. Up to 7 days
- ☐ D. Up to 4 weeks
- ☒ E. Up to 6 months

Finasteride treatment of BPH may take 6 months before results are seen

Benign prostatic hyperplasia

Benign prostatic hyperplasia (BPH) is a common condition seen in older men.

Risk factors

- age: around 50% of 50-year-old men will have evidence of BPH and 30% will have symptoms. Around 80% of 80-year-old men have evidence of BPH
- ethnicity: black > white > Asian

BPH typically presents with lower urinary tract symptoms (LUTS), which may be categorised into:

- voiding symptoms (obstructive): weak or intermittent urinary flow, straining, hesitancy, terminal dribbling and incomplete emptying
- storage symptoms (irritative) urgency, frequency, urgency incontinence and nocturia
- post-micturition: dribbling
- complications: urinary tract infection, retention, obstructive uropathy

Management options

- watchful waiting
- medication: alpha-1 antagonists, 5 alpha-reductase inhibitors. The use of combination therapy was supported by the Medical Therapy Of Prostatic Symptoms (MTOPS) trial
- surgery: transurethral resection of prostate (TURP)

Alpha-1 antagonists e.g. tamsulosin, alfuzosin

- decrease smooth muscle tone (prostate and bladder)
- considered first-line, improve symptoms in around 70% of men
- adverse effects: dizziness, postural hypotension, dry mouth, depression

5 alpha-reductase inhibitors e.g. finasteride

- block the conversion of testosterone to dihydrotestosterone (DHT), which is known to induce BPH
- unlike alpha-1 antagonists causes a reduction in prostate volume and hence may slow disease progression. This however takes time and symptoms may not improve for 6 months. They may also decrease PSA concentrations by up to 50%
- adverse effects: erectile dysfunction, reduced libido, ejaculation problems, gynaecomastia

Question 34 of 69

Which one of the following scenarios is the most common presentation of testicular cancer?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Painful testicular lump in a 56-year-old man |
| <input checked="" type="radio"/> | B. Painless testicular lump in a 27-year-old man |
| <input type="radio"/> | C. Painless testicular lump in a 43-year-old man |
| <input type="radio"/> | D. Painful testicular lump in a 25-year-old man |
| <input type="radio"/> | E. Painful testicular lump associated with dysuria in a 38-year-old man |

Testicular cancer

Testicular cancer is the most common malignancy in men aged 20-30 years. Around 95% of cases of testicular cancer are germ-cell tumours. Germ cell tumours may essentially be divided into:

- seminomas
- teratomas

Other type of germ cell tumours include yolk sac tumours. Non-germ cell tumours include Leydig cell tumours and sarcomas.

The peak incidence for teratomas is 25 years and seminomas is 35 years. Risk factors include:

- cryptorchidism
- infertility
- family history
- Klinefelter's syndrome
- mumps orchitis

Features

- a painless lump is the most common presenting symptom
- pain may also be present in a minority of men
- other possible features include hydrocele, gynaecomastia

Diagnosis

- ultrasound is first-line

Management

- orchidectomy
 - chemotherapy and radiotherapy may be given depending on staging
- Prognosis is generally excellent
- 5 year survival for seminomas is around 95% if Stage I
 - 5 year survival for teratomas is around 85% if Stage I

Question 35 of 69

A 25-year-old female presents to surgery with a 2 week history of painless rectal bleeding. Inspection of perineum and rectal examination is unremarkable. Proctoscopy reveals haemorrhoidal cushions at the left lateral and right anterior position. What is the most important component of management?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Sitz baths |
| <input type="radio"/> | B. Topical nitrate |
| <input checked="" type="radio"/> | C. Fibre supplementation |
| <input type="radio"/> | D. Improving anal hygiene |
| <input type="radio"/> | E. Application of lubricant prior to defecation |

Fibre supplementation has been shown to be as effective as injection sclerotherapy in some studies

Haemorrhoids

Haemorrhoidal tissue is part of the normal anatomy which contributes to anal continence. These mucosal vascular cushions are found in the left lateral, right posterior and right anterior portions of the anal canal (3 o'clock, 7 o'clock and 11 o'clock respectively). Haemorrhoids are said to exist when they become enlarged, congested and symptomatic

Clinical features

- painless rectal bleeding is the most common symptom
- pruritus
- pain: usually not significant unless piles are thrombosed
- soiling may occur with third or fourth degree piles

Types of haemorrhoids

External

- originate below the dentate line
- prone to thrombosis, may be painful

Internal

- originate above the dentate line
- do not generally cause pain

Grading of internal haemorrhoids

Grade I	Do not prolapse out of the anal canal
Grade II	Prolapse on defecation but reduce spontaneously
Grade III	Can be manually reduced
Grade IV	Cannot be reduced

Management

- soften stools: increase dietary fibre and fluid intake
- topical local anaesthetics and steroids may be used to help symptoms
- outpatient treatments: rubber band ligation is superior to injection sclerotherapy
- surgery is reserved for large symptomatic haemorrhoids which do not respond to outpatient treatments
- newer treatments: Doppler guided haemorrhoidal artery ligation, stapled haemorrhoidopexy

Acutely thrombosed external haemorrhoids

- typically present with significant pain
- examination reveals a purplish, oedematous, tender subcutaneous perianal mass
- if patient presents within 72 hours then referral should be considered for excision. Otherwise patients can usually be managed with stool softeners, ice packs and analgesia. Symptoms usually settle within 10 days

Theme: Scrotal problems

- A. Varicocele
- B. Testicular cancer
- C. Epididymo-orchitis
- D. Epididymal cyst
- E. Inguinal hernia
- F. Hydrocele
- G. Femoral hernia
- H. Hydatid of Morgagni
- I. Fournier's gangrene
- J. Cardiac failure

For each of the following scenarios please select the most likely diagnosis:

36. A 31-year-old man presents as he and his partner have been having problems conceiving. On examination there is a diffuse lumpy swelling on the left side of his scrotum. This is not painful and the testicle, which can be felt separately, is normal.

✓ Varicocele

37. A 44-year-old man notices a pea-sized lump on his right testicle. On examination a discrete soft mass can be felt posterior to the right testicle.

The correct answer is Epididymal cyst

38. A 75-year-old man presents with a swelling in his right scrotum. On examination a large, non-tender swelling is found in the scrotum. You cannot palpate above the swelling during the examination.

The correct answer is Inguinal hernia

A hydrocele is less likely as you cannot 'get above' the swelling on examination.

Scrotal problems

Epididymal cysts

Epididymal cysts are the most common cause of scrotal swellings seen in primary care.

Features

- separate from the body of the testicle
- found posterior to the testicle

Associated conditions

- polycystic kidney disease
- cystic fibrosis
- von Hippel-Lindau syndrome

Diagnosis may be confirmed by ultrasound.

Management is usually supportive but surgical removal or sclerotherapy may be attempted for larger or symptomatic cysts.

Hydrocele

A hydrocele describes the accumulation of fluid within the tunica vaginalis. They can be divided into communicating and non-communicating:

- communicating: caused by patency of the processus vaginalis allowing peritoneal fluid to drain down into the scrotum. Communicating hydroceles are common in newborn males (clinically apparent in 5-10%) and usually resolve within the first few months of life
- non-communicating: caused by excessive fluid production within the tunica vaginalis

Hydroceles may develop secondary to:

- epididymo-orchitis
- testicular torsion

- testicular tumours

Features

- soft, non-tender swelling of the hemi-scrotum. Usually anterior to and below the testicle
- the swelling is confined to the scrotum, you can get 'above' the mass on examination
- transilluminates with a pen torch
- the testis may be difficult to palpate if the hydrocele is large

Diagnosis may be clinical but ultrasound is required if there is any doubt about the diagnosis or if the underlying testis cannot be palpated.

Management

- infantile hydroceles are generally repaired if they do not resolve spontaneously by the age of 1-2 years
- in adults a conservative approach may be taken depending on the severity of the presentation. Further investigation (e.g. ultrasound) is usually warranted however to exclude any underlying cause such as a tumour

Varicocele

A varicocele is an abnormal enlargement of the testicular veins. They are usually asymptomatic but may be important as they are associated with infertility.

Varicoceles are much more common on the left side (> 80%). Features:

- classically described as a 'bag of worms'
- subfertility

Diagnosis

- ultrasound with Doppler studies

Management

- usually conservative

- occasionally surgery is required if the patient is troubled by pain. There is ongoing debate regarding the effectiveness of surgery to treat infertility

Question 39 of 69

A 55-year-old accountant presents to surgery requesting a sick note following an open repair of an inguinal hernia. According to Department of Work and Pensions advice, when should he be able to return to work?

- | | |
|----------------------------------|----------------------|
| <input type="radio"/> | A. After 5 days |
| <input type="radio"/> | B. After 7 days |
| <input type="radio"/> | C. After 1 - 2 weeks |
| <input checked="" type="radio"/> | D. After 2 - 3 weeks |
| <input type="radio"/> | E. After 3 - 4 weeks |

Inguinal hernia repair: back to work after 2-3 weeks if open, 1-2 weeks if laparoscopic

Inguinal hernia

Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male; men have around a 25% lifetime risk of developing an inguinal hernia.

Features

- groin lump: disappears on pressure or when the patient lies down
- discomfort and ache: often worse with activity, severe pain is uncommon
- strangulation is rare

Whilst traditional textbooks describe the anatomical differences between indirect (hernia through the

inguinal canal) and direct hernias (through the posterior wall of the inguinal canal) this is of no relevance to the clinical management.

Management

- the clinical consensus is currently to treat medically fit patients even if they are asymptomatic
- a hernia truss may be an option for patients not fit for surgery but probably has little role in other patients
- mesh repair is associated with the lowest recurrence rate

The Department for Work and Pensions recommend that following an open repair patients return to non-manual work after 2-3 weeks and following laparoscopic repair after 1-2 weeks

Complications

- early: bruising, wound infection
- late: chronic pain, recurrence

Question 40 of 69

Which one of the following statements regarding varicoceles is correct?



<input checked="" type="radio"/>	A. Over 80% occur on the left side
<input type="radio"/>	B. All patients should be offered surgery to prevent infertility
<input type="radio"/>	C. Around 5% of patients have an underlying testicular cancer
<input type="radio"/>	D. They are more common in pre-pubertal males
<input type="radio"/>	E. Having a varicocele is a risk factor for deep vein thrombosis

Scrotal problems

Epididymal cysts

Epididymal cysts are the most common cause of scrotal swellings seen in primary care.

Features

- separate from the body of the testicle
- found posterior to the testicle

Associated conditions

- polycystic kidney disease
- cystic fibrosis
- von Hippel-Lindau syndrome

Diagnosis may be confirmed by ultrasound.

Management is usually supportive but surgical removal or sclerotherapy may be attempted for larger or symptomatic cysts.

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- communicating: caused by patency of the processus vaginalis allowing peritoneal fluid to drain down into the scrotum. Communicating hydroceles are common in newborn males (clinically apparent in 5-10%) and usually resolve within the first few months of life
- non-communicating: caused by excessive fluid production within the tunica vaginalis

Hydroceles may develop secondary to:

- epididymo-orchitis
- testicular torsion
- testicular tumours

Features

- soft, non-tender swelling of the hemi-scrotum. Usually anterior to and below the testicle
- the swelling is confined to the scrotum, you can get 'above' the mass on examination
- transilluminates with a pen torch
- the testis may be difficult to palpate if the hydrocele is large

Diagnosis may be clinical but ultrasound is required if there is any doubt about the diagnosis or if the underlying testis cannot be palpated.

Management

- infantile hydroceles are generally repaired if they do not resolve spontaneously by the age of 1-2 years
- in adults a conservative approach may be taken depending on the severity of the presentation. Further investigation (e.g. ultrasound) is usually warranted however to exclude any underlying cause such as a tumour

Varicocele

A varicocele is an abnormal enlargement of the testicular veins. They are usually asymptomatic but may be important as they are associated with infertility.

Varicoceles are much more common on the left side (> 80%). Features:

- classically described as a 'bag of worms'
- subfertility

Diagnosis

- ultrasound with Doppler studies

Management

- usually conservative
- occasionally surgery is required if the patient is troubled by pain. There is ongoing debate regarding the effectiveness of surgery to treat infertility

Question 41 of 69

A 60-year-old man presents with lower urinary tract symptoms and is offered a PSA test. According to NHS guidelines, which one of the following could interfere with the PSA level?



- ☒ A. Vigorous exercise in the past 48 hours
- ☐ B. Poorly controlled diabetes mellitus
- ☐ C. Smoking in the past 48 hours
- ☐ D. Current constipation
- ☐ E. Drinking more than 4 units of alcohol in the past 48 hours

Prostate cancer: PSA testing

Prostate specific antigen (PSA) is a serine protease enzyme produced by normal and malignant prostate epithelial cells. It has become an important tumour marker but much controversy still exists regarding its usefulness as a screening tool.

The NHS Prostate Cancer Risk Management Programme (PCRMP) has published updated guidelines in 2009 on how to handle requests for PSA testing in asymptomatic men. A recent European trial (ERSPC) showed a statistically significant reduction in the rate of death prostate cancer by 20% in men aged 55 to 69 years but this was associated with a high risk of over-diagnosis and over-treatment. Having reviewed this and other data the National Screening Committee have decided not to introduce a prostate cancer screening programme yet but rather allow men to make an informed choice.

Age-adjusted upper limits for PSA were recommended by the PCRMP:

Age	PSA level (ng/ml)
50-59 years	3.0
60-69 years	4.0
> 70 years	5.0

PSA levels may also be raised by*:

- benign prostatic hyperplasia (BPH)
- prostatitis and urinary tract infection (NICE recommend to postpone the PSA test for at least 1 month after treatment)
- ejaculation (ideally not in the previous 48 hours)
- vigorous exercise (ideally not in the previous 48 hours)
- urinary retention
- instrumentation of the urinary tract

Poor specificity and sensitivity

- around 33% of men with a PSA of 4-10 ng/ml will be found to have prostate cancer. With a PSA of 10-20 ng/ml this rises to 60% of men
- around 20% with prostate cancer have a normal PSA
- various methods are used to try and add greater meaning to a PSA level including age-adjusted upper limits and monitoring change in PSA level with time (PSA velocity or PSA doubling time)

*whether digital rectal examination actually causes a rise in PSA levels is a matter of debate

Question 42 of 69

You review a 9-month-old who has parents of Jamaican origin. His parents have noticed a small swelling around his umbilicus. He is a well child who is on the 50th centile. On examination you note a small, reducible umbilical hernia which is less than 1 cm in size. What is the most appropriate management?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Contact the local Child Protection Officer |
| <input type="radio"/> | B. Admit to paediatrics |
| <input checked="" type="radio"/> | C. Reassure the parents that the vast majority resolve by the age of 4-5 years |
| <input type="radio"/> | D. Refer to paediatric surgeon |



E. Refer to a paediatrician for a sweat test

Congenital hernias

- inguinal: repair ASAP
- umbilical: manage conservatively

This little boy has an umbilical hernia. The vast majority are managed conservatively as usually (>90%) resolve spontaneously.

Abdominal wall hernias

The classical surgical definition of a hernia is the protrusion of an organ or the fascia of an organ through the wall of the cavity that normally contains it.

Risk factors for abdominal wall hernias include:

- obesity
- ascites
- increasing age
- surgical wounds

Features

- palpable lump
- cough impulse
- pain
- obstruction: more common in femoral hernias
- strangulation: may compromise the bowel blood supply leading to infarction

Types of abdominal wall hernias:

Type of hernia	Details
Inguinal hernia	Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male;

Type of hernia	Details
	men have around a 25% lifetime risk of developing an inguinal hernia. Above and medial to pubic tubercle Strangulation is rare
Femoral hernia	Below and lateral to the pubic tubercle More common in women, particularly multiparous ones High risk of obstruction and strangulation Surgical repair is required
Umbilical hernia	Symmetrical bulge under the umbilicus
Paraumbilical hernia	Asymmetrical bulge - half the sac is covered by skin of the abdomen directly above or below the umbilicus
Epigastric hernia	Lump in the midline between umbilicus and the xiphisternum Most common in men aged 20-30 years
Incisional hernia	May occur in up to 10% of abdominal operations
Spigelian hernia	Also known as lateral ventral hernia Rare and seen in older patients A hernia through the spigelian fascia (the aponeurotic layer between the rectus abdominis muscle medially and the semilunar line laterally)
Obturator hernia	A hernia which passes through the obturator foramen. More common in females and typical presents with bowel obstruction
Richter hernia	A rare type of hernia where only the antimesenteric border of the bowel herniates through the fascial defect

Abdominal wall hernias in children:

Type of hernia	Details
Congenital inguinal hernia	Indirect hernias resulting from a patent processus vaginalis Occur in around 1% of term babies. More common in premature babies and boys 60% are right sided, 10% are bilaterally Should be surgically repaired soon after diagnosis as at risk of incarceration
Infantile umbilical hernia	Symmetrical bulge under the umbilicus More common in premature and Afro-Caribbean babies

Type of hernia	Details
	The vast majority resolve without intervention before the age of 4-5 years Complications are rare

Question 43 of 69

Which one of the following statements regarding lidocaine is correct?

- ✓ ☒ A. Preparations mixed with adrenaline should not be used for minor surgery involving the finger
- ☐ B. The maximum dose of lidocaine is 5mg/kg
- ☐ C. The anaesthetic effect usual wears off after 15-20 minutes
- ☐ D. Is contraindicated in patients with a history of ventricular tachycardia
- ☐ E. Preparations mixed with adrenaline are more likely to cause blood loss

Minor surgery

Local anaesthetic (LA)

Lidocaine is the most widely used LA. It has a rapid onset of action and anaesthesia lasts for around 1 hour.

- the maximum safe dose is 3mg/kg. The BNF states 200mg (or 500mg if given in solutions containing adrenaline), which equates to 3mg/kg for a 66kg patient. This is the equivalent of 20ml of 1% solution or 10ml of 2% solution
- lidocaine is available pre-mixed with adrenaline. This increases the duration of action of lidocaine and reduces blood loss secondary to vasoconstriction. It must never be used near extremities due to the risk of ischaemia

Suture material

Non-absorbable	Absorbable
Silk Novafil Prolene Ethilon	Vicryl Dexon PDS



Non-absorbable sutures are normally removed after 7-14 days, depending on the location.

Absorbable sutures normally disappear after 7-10 days. Removal times for non-absorbable sutures are shown below:

Area	Removal time (days)
Face	3 - 5
Scalp, limbs, chest	7 - 10
Hand, foot, back	10 - 14

Question 44 of 69

A 62-year-old man is called for review after a positive faecal occult blood test done as part of the national screening programme. During counselling for colonoscopy he asks what percentage of patients with a positive faecal occult blood test have colorectal cancer. What is the most accurate answer?

-  ☐ A. 0.5 - 2%
-  ☒ B. 5 - 15%
- ☐ C. 20 - 30%
- ☐ D. 30 - 50%
- ☐ E. 55 - 75%

Colorectal cancer screening - PPV of FOB = 5 - 15%

There is also a 30-45% chance of having an adenoma with a positive faecal occult blood test

Colorectal cancer: screening

Overview

- most cancers develop from adenomatous polyps. Screening for colorectal cancer has been shown to reduce mortality by 16%
- the NHS now has a national screening programme offering screening every 2 years to all men and women aged 60 to 69 years. Patients aged over 70 years may request screening
- eligible patients are sent faecal occult blood (FOB) tests through the post
- patients with abnormal results are offered a colonoscopy

At colonoscopy, approximately:

- 5 out of 10 patients will have a normal exam
- 4 out of 10 patients will be found to have polyps which may be removed due to their premalignant potential
- 1 out of 10 patients will be found to have cancer

Question 45 of 69

Which one of the following statements regarding male circumcision is correct?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Circumcision should always be performed under a general anaesthetic |
| <input type="radio"/> | B. It is available on the NHS in areas with a high Jewish or Islamic population |
| <input type="radio"/> | C. Increases the risk of penile cancer |
| <input checked="" type="radio"/> | D. Reduces the rate of HIV transmission |
| <input type="radio"/> | E. All infants with hypospadias should be circumcised before the age of 1 year |

Circumcision

Circumcision has been performed in a variety of cultures for thousands of years. Today it is mainly people of the Jewish and Islamic faith who undergo circumcision for religious/cultural reasons. Circumcision for religious or cultural reasons is not available on the NHS.

The medical benefits of routine circumcision remain controversial although some evidence has emerged that it:

- reduces the risk of penile cancer
- reduces the risk of UTI
- reduces the risk of acquiring sexually transmitted infections including HIV

Medical indications for circumcision

- phimosis
- recurrent balanitis
- balanitis xerotica obliterans
- paraphimosis

It is important to exclude hypospadias prior to circumcision as the foreskin may be used in surgical repair. Circumcision may be performed under a local or general anaesthetic.

Question 46 of 69

A 72-year-old man is diagnosed with prostate cancer and goserelin (Zoladex) is prescribed. Which one of the following is it most important to co-prescribe for the first three weeks of treatment?

- | | |
|----------------------------------|------------------------|
| <input type="radio"/> | A. Tamoxifen |
| <input type="radio"/> | B. Lansoprazole |
| <input type="radio"/> | C. Allopurinol |
| <input checked="" type="radio"/> | D. Cyproterone acetate |
| <input type="radio"/> | E. Tamsulosin |

Anti-androgen treatment such as cyproterone acetate should be co-prescribed when starting gonadorelin analogues due to the risk of tumour flare. This phenomenon is secondary to initial stimulation of luteinising hormone release by the pituitary gland resulting in increased testosterone levels.

The BNF advises starting cyproterone acetate 3 days before the gonadorelin analogue.

Prostate cancer: management

Localised prostate cancer (T1/T2)

Treatment depends on life expectancy and patient choice. Options include:

- conservative: active monitoring & watchful waiting
- radical prostatectomy
- radiotherapy: external beam and brachytherapy

Localised advanced prostate cancer (T3/T4)

Options include:

- hormonal therapy: see below
- radical prostatectomy
- radiotherapy: external beam and brachytherapy

Metastatic prostate cancer disease - hormonal therapy

Synthetic GnRH agonist

- e.g. Goserelin (Zoladex)
- cover initially with anti-androgen to prevent rise in testosterone

Anti-androgen

- cyproterone acetate prevents DHT binding from intracytoplasmic protein complexes

Orchidectomy

Question 47 of 69

A 64-year-old man who is asymptomatic requests a PSA test. What is the upper limit of normal for a man of this age?

- ☐ A. 3.0 ng/ml
- ☐ B. 3.5 ng/ml
- ☒ C. 4.0 ng/ml
- ☐ D. 4.5 ng/ml
- ☐ E. 5.0 ng/ml

Prostate cancer: PSA testing

Prostate specific antigen (PSA) is a serine protease enzyme produced by normal and malignant prostate epithelial cells. It has become an important tumour marker but much controversy still exists regarding its usefulness as a screening tool.

The NHS Prostate Cancer Risk Management Programme (PCRMP) has published updated guidelines in 2009 on how to handle requests for PSA testing in asymptomatic men. A recent European trial (ERSPC) showed a statistically significant reduction in the rate of death prostate cancer by 20% in men aged 55 to 69 years but this was associated with a high risk of over-diagnosis and over-treatment. Having reviewed this and other data the National Screening Committee have decided not to introduce a prostate cancer screening programme yet but rather allow men to make an informed choice.

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PSA levels may also be raised by*:

- benign prostatic hyperplasia (BPH)
- prostatitis and urinary tract infection (NICE recommend to postpone the PSA test for at least 1 month after treatment)
- ejaculation (ideally not in the previous 48 hours)
- vigorous exercise (ideally not in the previous 48 hours)
- urinary retention
- instrumentation of the urinary tract

Poor specificity and sensitivity

- around 33% of men with a PSA of 4-10 ng/ml will be found to have prostate cancer. With a PSA of 10-20 ng/ml this rises to 60% of men
- around 20% with prostate cancer have a normal PSA
- various methods are used to try and add greater meaning to a PSA level including age-adjusted upper limits and monitoring change in PSA level with time (PSA velocity or PSA doubling time)

*whether digital rectal examination actually causes a rise in PSA levels is a matter of debate

Question 48 of 69

A 33-year-old pregnant woman presents with pruritus ani. Which one of the following statements regarding haemorrhoids is incorrect?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Painless rectal bleeding is the most common symptom |
| <input type="radio"/> | B. Haemorrhoidal tissue is part of the normal anatomy |
| <input type="radio"/> | C. Internal haemorrhoids do not generally cause pain |
| <input type="radio"/> | D. Soiling may be seen |
| <input checked="" type="radio"/> | E. Usually occur at the 1 o'clock, 5 o'clock and 9 o'clock position |

Haemorrhoids usually occur at the 3 o'clock, 7 o'clock and 11 o'clock position

Haemorrhoids

Haemorrhoidal tissue is part of the normal anatomy which contributes to anal continence. These mucosal vascular cushions are found in the left lateral, right posterior and right anterior portions of the anal canal (3 o'clock, 7 o'clock and 11 o'clock respectively). Haemorrhoids are said to exist when they become enlarged, congested and symptomatic

Clinical features

- painless rectal bleeding is the most common symptom
- pruritus
- pain: usually not significant unless piles are thrombosed
- soiling may occur with third or fourth degree piles

Types of haemorrhoids

External

- originate below the dentate line
- prone to thrombosis, may be painful

Internal

- originate above the dentate line
- do not generally cause pain

Grading of internal haemorrhoids

Grade I	Do not prolapse out of the anal canal
Grade II	Prolapse on defecation but reduce spontaneously
Grade III	Can be manually reduced
Grade IV	Cannot be reduced

Management

- soften stools: increase dietary fibre and fluid intake
- topical local anaesthetics and steroids may be used to help symptoms
- outpatient treatments: rubber band ligation is superior to injection sclerotherapy
- surgery is reserved for large symptomatic haemorrhoids which do not respond to outpatient treatments
- newer treatments: Doppler guided haemorrhoidal artery ligation, stapled haemorrhoidopexy

Acutely thrombosed external haemorrhoids

- typically present with significant pain
- examination reveals a purplish, oedematous, tender subcutaneous perianal mass
- if patient presents within 72 hours then referral should be considered for excision. Otherwise patients can usually be managed with stool softeners, ice packs and analgesia. Symptoms usually settle within 10 days

Question 49 of 69

A 76-year-old man presents with lower urinary tract symptoms. Following a digital rectal examination and prostate specific antigen test a diagnosis of benign prostatic hyperplasia is made and finasteride is started. What is the mechanism of action of this drug?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Alpha-1 antagonist |
| <input type="radio"/> | B. 5-alpha receptor antagonist |
| <input type="radio"/> | C. Testosterone receptor antagonist |
| <input type="radio"/> | D. Alpha-1 agonists |
| <input checked="" type="radio"/> | E. Inhibits conversion of testosterone to dihydrotestosterone |

Finasteride: 5 alpha-reductase inhibitor - inhibits conversion of testosterone to dihydrotestosterone

Benign prostatic hyperplasia

Benign prostatic hyperplasia (BPH) is a common condition seen in older men.

Risk factors

- age: around 50% of 50-year-old men will have evidence of BPH and 30% will have symptoms. Around 80% of 80-year-old men have evidence of BPH
- ethnicity: black > white > Asian

BPH typically presents with lower urinary tract symptoms (LUTS), which may be categorised into:

- voiding symptoms (obstructive): weak or intermittent urinary flow, straining, hesitancy, terminal dribbling and incomplete emptying
- storage symptoms (irritative) urgency, frequency, urgency incontinence and nocturia
- post-micturition: dribbling
- complications: urinary tract infection, retention, obstructive uropathy

Management options

- watchful waiting
- medication: alpha-1 antagonists, 5 alpha-reductase inhibitors. The use of combination therapy was supported by the Medical Therapy Of Prostatic Symptoms (MTOPS) trial
- surgery: transurethral resection of prostate (TURP)

Alpha-1 antagonists e.g. tamsulosin, alfuzosin

- decrease smooth muscle tone (prostate and bladder)
- considered first-line, improve symptoms in around 70% of men
- adverse effects: dizziness, postural hypotension, dry mouth, depression

5 alpha-reductase inhibitors e.g. finasteride

- block the conversion of testosterone to dihydrotestosterone (DHT), which is known to induce BPH
- unlike alpha-1 antagonists causes a reduction in prostate volume and hence may slow disease progression. This however takes time and symptoms may not improve for 6 months. They may also decrease PSA concentrations by up to 50%
- adverse effects: erectile dysfunction, reduced libido, ejaculation problems, gynaecomastia

Question 50 of 69

What is the lifetime risk of developing colorectal cancer in the United Kingdom?

- | | |
|----------------------------------|--------|
| <input type="radio"/> | A. 1% |
| <input type="radio"/> | B. 2% |
| <input checked="" type="radio"/> | C. 5% |
| <input type="radio"/> | D. 10% |
| <input type="radio"/> | E. 15% |

Next question

Colorectal cancer is the third most common cancer in the UK, with approximately 30,000 new cases in England and Wales per year

Colorectal cancer: screening

Overview

- most cancers develop from adenomatous polyps. Screening for colorectal cancer has been shown to reduce mortality by 16%
- the NHS now has a national screening programme offering screening every 2 years to all men and women aged 60 to 69 years. Patients aged over 70 years may request screening
- eligible patients are sent faecal occult blood (FOB) tests through the post
- patients with abnormal results are offered a colonoscopy

At colonoscopy, approximately:

- 5 out of 10 patients will have a normal exam
- 4 out of 10 patients will be found to have polyps which may be removed due to their premalignant potential
- 1 out of 10 patients will be found to have cancer

Question 51 of 69

What is the maximum safe volume of lidocaine 1% that may be used during minor surgery on an average sized adult?

- ☐ A. 10 ml
- ☐ B. 30 ml
- ☐ C. 50 ml
- ☒ D. 20 ml
- ☐ E. 5 ml

Minor surgery

Local anaesthetic (LA)

Lidocaine is the most widely used LA. It has a rapid onset of action and anaesthesia lasts for around 1 hour.

- the maximum safe dose is 3mg/kg. The BNF states 200mg (or 500mg if given in solutions containing adrenaline), which equates to 3mg/kg for a 66kg patient. This is the equivalent of 20ml of 1% solution or 10ml of 2% solution
- lidocaine is available pre-mixed with adrenaline. This increases the duration of action of lidocaine and reduces blood loss secondary to vasoconstriction. It must never be used near

extremities due to the risk of ischaemia

Suture material

Non-absorbable	Absorbable
Silk Novafil Prolene Ethilon	Vicryl Dexon PDS

Non-absorbable sutures are normally removed after 7-14 days, depending on the location.

Absorbable sutures normally disappear after 7-10 days. Removal times for non-absorbable sutures are shown below:

Area	Removal time (days)
Face	3 - 5
Scalp, limbs, chest	7 - 10
Hand, foot, back	10 - 14

Question 52 of 69

Next

A 50-year-old woman presents with right-sided medial thigh pain for the past week. There has been no change in her bowels. On examination you noticed a grape sized lump below and lateral to the right pubic tubercle which is difficult to reduce. What is the most likely diagnosis?

- ☐ A. Inguinal hernia
- ☐ B. Richter hernia
- ☐ C. Spigelian hernia
- ☐ D. Obturator hernia
- ☒ E. Femoral hernia

Abdominal wall hernias

The classical surgical definition of a hernia is the protrusion of an organ or the fascia of an organ through the wall of the cavity that normally contains it.

Risk factors for abdominal wall hernias include:

- obesity
- ascites
- increasing age
- surgical wounds

Features

- palpable lump
- cough impulse
- pain
- obstruction: more common in femoral hernias
- strangulation: may compromise the bowel blood supply leading to infarction

Types of abdominal wall hernias:

Type of hernia	Details
Inguinal hernia	Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male; men have around a 25% lifetime risk of developing an inguinal hernia. Above and medial to pubic tubercle Strangulation is rare
Femoral hernia	Below and lateral to the pubic tubercle More common in women, particularly multiparous ones High risk of obstruction and strangulation Surgical repair is required
Umbilical hernia	Symmetrical bulge under the umbilicus
Paraumbilical hernia	Asymmetrical bulge - half the sac is covered by skin of the abdomen directly above or below the umbilicus
Epigastric hernia	Lump in the midline between umbilicus and the xiphisternum

Type of hernia	Details
	Most common in men aged 20-30 years
Incisional hernia	May occur in up to 10% of abdominal operations
Spigelian hernia	Also known as lateral ventral hernia Rare and seen in older patients A hernia through the spigelian fascia (the aponeurotic layer between the rectus abdominis muscle medially and the semilunar line laterally)
Obturator hernia	A hernia which passes through the obturator foramen. More common in females and typical presents with bowel obstruction
Richter hernia	A rare type of hernia where only the antimesenteric border of the bowel herniates through the fascial defect

Abdominal wall hernias in children:

Type of hernia	Details
Congenital inguinal hernia	Indirect hernias resulting from a patent processus vaginalis Occur in around 1% of term babies. More common in premature babies and boys 60% are right sided, 10% are bilaterally Should be surgically repaired soon after diagnosis as at risk of incarceration
Infantile umbilical hernia	Symmetrical bulge under the umbilicus More common in premature and Afro-Caribbean babies The vast majority resolve without intervention before the age of 4-5 years Complications are rare

Question 53-55 of 69

Theme: Suture removal


- A. 2 days
- B. 4 days
- C. 8 days
- D. 12 days
- E. 16 days
- F. 21 days

For each one of the following locations please select the optimal time to remove the sutures. Assume the patient has had a small skin lesion removed in primary care and has no relevant medical history.


53. Back

 12 days

54. Face

 4 days

55. Scalp

 8 days

Minor surgery

Local anaesthetic (LA)

Lidocaine is the most widely used LA. It has a rapid onset of action and anaesthesia lasts for around 1 hour.

- the maximum safe dose is 3mg/kg. The BNF states 200mg (or 500mg if given in solutions containing adrenaline), which equates to 3mg/kg for a 66kg patient. This is the equivalent of 20ml of 1% solution or 10ml of 2% solution
- lidocaine is available pre-mixed with adrenaline. This increases the duration of action of lidocaine and reduces blood loss secondary to vasoconstriction. It must never be used near extremities due to the risk of ischaemia

Suture material

Non-absorbable	Absorbable
Silk Novafil Prolene Ethilon	Vicryl Dexon PDS

Non-absorbable sutures are normally removed after 7-14 days, depending on the location. Absorbable sutures normally disappear after 7-10 days. Removal times for non-absorbable sutures are shown below:

Area	Removal time (days)
Face	3 - 5
Scalp, limbs, chest	7 - 10
Hand, foot, back	10 - 14

Question 56 of 69

A 31-year-old man returns for review. He was diagnosed with an anal fissure around 7 weeks ago and has tried dietary modification, laxatives and topical anaesthetic with little benefit. What is the most appropriate next step?

- ☐ A. Refer to secondary care
- ☐ B. Oral calcium channel blocker
- ☐ C. Topical steroid
- ☐ D. Buccal glyceryl trinitrate prior to defecation
- ☒ E. Topical glyceryl trinitrate

Anal fissure - topical glyceryl trinitrate

Anal fissure

Anal fissures are longitudinal or elliptical tears of the squamous lining of the distal anal canal. If present for less than 6 weeks they are defined as acute, and chronic if present for more than 6 weeks. Around 90% of anal fissures occur on the posterior midline

Management of an acute anal fissure (< 6 weeks)

- dietary advice: high-fibre diet with high fluid intake
- bulk-forming laxatives are first line - if not tolerated then lactulose should be tried
- lubricants such as petroleum jelly may be tried before defecation
- topical anaesthetics

-analgesia

- topical steroids do not provide significant relief

Management of a chronic anal fissure (> 6 weeks)

- the above techniques should be continued
- topical glyceryl trinitrate (GTN) is first line treatment for a chronic anal fissure
- if topical GTN is not effective after 8 weeks then secondary referral should be considered for surgery or botulinum toxin

Question 57 of 69

A 50-year-old man who is known to have obesity and hypertension comes for review. His current BMI is 38 kg/m² and blood pressure today is 154/92 mmHg despite ramipril and bendroflumethiazide. Lifestyle and a trial of orlistat have failed to reduce his weight. Which one of the following is the most suitable intervention?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Biliopancreatic diversion with duodenal switch |
| <input checked="" type="radio"/> | B. Laparoscopic-adjustable gastric banding |
| <input type="radio"/> | C. Trial of sibutramine |
| <input type="radio"/> | D. Referral for counselling to discuss his excessive eating |
| <input type="radio"/> | E. Sleeve gastrectomy |

Laparoscopic-adjustable gastric banding is the intervention of choice in patients with a BMI < 40 kg/m².

Sibutramine has recently been withdrawn due to concerns about a possible increased risk of cardiovascular events.

Obesity: bariatric surgery

The use of bariatric surgery in the management of obesity has developed significantly over the past decade. It is now recognised that for many obese patients who fail to lose weight with lifestyle and

drug interventions the risks and expense of long-term obesity outweigh those of surgery.

NICE guidelines on bariatric surgery for adults

Consider surgery for people with severe obesity if:

- they have a BMI of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² and other significant disease (for example, type 2 diabetes mellitus, hypertension) that could be improved if they lost weight
- all appropriate non-surgical measures have failed to achieve or maintain adequate clinically beneficial weight loss for at least 6 months
- they are receiving or will receive intensive specialist management
- they are generally fit for anaesthesia and surgery
- they commit to the need for long-term follow-up

Consider surgery as a first-line option for adults with a BMI of more than 50 kg/m² in whom surgical intervention is considered appropriate; consider orlistat before surgery if the waiting time is long

Types of bariatric surgery:

- primarily restrictive: laparoscopic-adjustable gastric banding (LAGB) or sleeve gastrectomy
- primarily malabsorptive: classic biliopancreatic diversion (BPD) has now largely been replaced by biliopancreatic diversion with duodenal switch
- mixed: Roux-en-Y gastric bypass surgery

Which operation?

- LAGB produces less weight loss than malabsorptive or mixed procedures but as it has fewer complications it is normally the first-line intervention in patients with a BMI of 30-39kg/m²
- patients with a BMI > 40 kg/m² may be considered for a gastric bypass or sleeve gastrectomy. The latter may be done as a sole procedure or as an initial procedure prior to bypass
- primarily malabsorptive procedures are usually reserved for very obese patients (e.g. BMI > 60 kg/m²)

Question 58 of 69

Which one of the following statements regarding congenital inguinal hernias is correct?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. They should be managed conservatively |
| <input type="radio"/> | B. Result from the premature closure of the processus vaginalis |
| <input type="radio"/> | C. They are more common in girls |
| <input type="radio"/> | D. The incidence in newborns is 0.1-0.2% |
| <input checked="" type="radio"/> | E. They are more common on the right side |

Abdominal wall hernias

The classical surgical definition of a hernia is the protrusion of an organ or the fascia of an organ through the wall of the cavity that normally contains it.

Risk factors for abdominal wall hernias include:

- obesity
- ascites
- increasing age
- surgical wounds

Features

- palpable lump
- cough impulse
- pain
- obstruction: more common in femoral hernias
- strangulation: may compromise the bowel blood supply leading to infarction

Types of abdominal wall hernias:

Type of hernia	Details
Inguinal hernia	Inguinal hernias account for 75% of abdominal wall hernias. Around 95% of patients are male; men have around a 25% lifetime risk of developing an inguinal hernia. Above and medial to pubic tubercle Strangulation is rare
Femoral hernia	Below and lateral to the pubic tubercle More common in women, particularly multiparous ones High risk of obstruction and strangulation Surgical repair is required
Umbilical hernia	Symmetrical bulge under the umbilicus
Paraumbilical hernia	Asymmetrical bulge - half the sac is covered by skin of the abdomen directly above or below the umbilicus
Epigastric hernia	Lump in the midline between umbilicus and the xiphisternum Most common in men aged 20-30 years
Incisional hernia	May occur in up to 10% of abdominal operations
Spigelian hernia	Also known as lateral ventral hernia Rare and seen in older patients A hernia through the spigelian fascia (the aponeurotic layer between the rectus abdominis muscle medially and the semilunar line laterally)
Obturator hernia	A hernia which passes through the obturator foramen. More common in females and typical presents with bowel obstruction
Richter hernia	A rare type of hernia where only the antimesenteric border of the bowel herniates through the fascial defect

Abdominal wall hernias in children:

Type of hernia	Details
Congenital inguinal hernia	Indirect hernias resulting from a patent processus vaginalis Occur in around 1% of term babies. More common in premature babies and boys 60% are right sided, 10% are bilaterally Should be surgically repaired soon after diagnosis as at risk of incarceration
Infantile umbilical hernia	Symmetrical bulge under the umbilicus

Type of hernia	Details
	<p>More common in premature and Afro-Caribbean babies</p> <p>The vast majority resolve without intervention before the age of 4-5 years</p> <p>Complications are rare</p>

Question 59-61 of 69

Theme: Breast disorders

- A. Lipoma
- B. Paget's disease of the breast
- C. Breast cancer
- D. Sebaceous cysts
- E. Fibroadenoma
- F. Fibroadenosis
- G. Duct papilloma
- H. Breast abscess
- I. Fat necrosis
- J. Mammary duct ectasia

For each one of the following please select the most appropriate answer:

- 59.** A 49-year-old woman presents with a tender lump around the areola associated with a green nipple discharge.

The correct answer is Mammary duct ectasia

- 60.** An obese woman presents with an irregular lump on the lateral aspect of her right breast associated with skin tethering. Biopsy excludes a malignant cause.

The correct answer is Fat necrosis

61. A 41-year-old woman presents with pain and an irregular mobile lump in her left breast.

The correct answer is Breast cancer

Breast disorders

The table below describes some of the features seen in the most common breast disorders:

Disorder	Features
Fibroadenoma	Common in women under the age of 30 years Often described as 'breast mice' due as they are discrete, non-tender, highly mobile lumps
Fibroadenosis (fibrocystic disease, benign mammary dysplasia)	Most common in middle-aged women 'Lumpy' breasts which may be painful. Symptoms may worsen prior to menstruation
Breast cancer	Characteristically a hard, irregular lump. There may be associated nipple inversion or skin tethering Paget's disease of the breast - intraductal carcinoma associated with a reddening and thickening (may resemble eczematous changes) of the skin/areola
Mammary duct ectasia	Dilatation of the large breast ducts Most common around the menopause May present with a tender lump around the areola +/- a green nipple discharge If ruptures may cause local inflammation, sometimes referred to as 'plasma cell mastitis'
Duct papilloma	Local areas of epithelial proliferation in large mammary ducts Hyperplastic lesions rather than malignant or premalignant May present with blood stained discharge

Disorder	Features
Fat necrosis	<p>More common in obese women with large breasts</p> <p>May follow trivial or unnoticed trauma</p> <p>Initial inflammatory response, the lesion is typical firm and round but may develop into a hard, irregular breast lump</p> <p>Rare and may mimic breast cancer so further investigation is always warranted</p>
Breast abscess	<p>More common in lactating women</p> <p>Red, hot tender swelling</p>

Lipomas and sebaceous cysts may also develop around the breast tissue.

Question 62 of 69

Which one of the following statements regarding testicular cancer is correct?

- ☐ A. Fragile X syndrome is a risk factor
- ☐ B. Gynaecomastia is seen in the majority of men
- ☒ C. Seminomas have a better prognosis than teratomas
- ☐ D. Afro-Caribbean ethnicity is a risk factor
- ☐ E. May present as a varicocele in up to 10% of patients

Testicular cancer

Testicular cancer is the most common malignancy in men aged 20-30 years. Around 95% of cases of testicular cancer are germ-cell tumours. Germ cell tumours may essentially be divided into:

- seminomas
- teratomas

Other type of germ cell tumours include yolk sac tumours. Non-germ cell tumours include Leydig cell tumours and sarcomas.

The peak incidence for teratomas is 25 years and seminomas is 35 years. Risk factors include:

- cryptorchidism
- infertility
- family history
- Klinefelter's syndrome
- mumps orchitis

Features

- a painless lump is the most common presenting symptom
- pain may also be present in a minority of men
- other possible features include hydrocele, gynaecomastia

Diagnosis

- ultrasound is first-line

Management

- orchidectomy
- chemotherapy and radiotherapy may be given depending on staging

Prognosis is generally excellent

- 5 year survival for seminomas is around 95% if Stage I
- 5 year survival for teratomas is around 85% if Stage I

Question 63 of 69

You are discussing an elevated PSA result with one of your patients, a 62-year-old man with a PSA level of 7.2 ng/ml. Which procedure is he most likely to have following referral to a urologist?

- ☐ A. Prostatectomy
- ☐ B. Cystoscopy with prostate biopsy
- ☐ C. Staging CT scan
- ☐ D. MRI pelvis
- ☒ E. TRUS-guided biopsy

A TRUS-guided biopsy is needed to clarify the diagnosis as around two-thirds of such patients will not have prostate cancer.

Prostate cancer: PSA testing

Prostate specific antigen (PSA) is a serine protease enzyme produced by normal and malignant prostate epithelial cells. It has become an important tumour marker but much controversy still exists regarding its usefulness as a screening tool.

The NHS Prostate Cancer Risk Management Programme (PCRMP) has published updated guidelines in 2009 on how to handle requests for PSA testing in asymptomatic men. A recent European trial (ERSPC) showed a statistically significant reduction in the rate of death from prostate cancer by 20% in men aged 55 to 69 years but this was associated with a high risk of over-diagnosis and over-treatment. Having reviewed this and other data the National Screening Committee have decided not to introduce a prostate cancer screening programme yet but rather allow men to make an informed choice.

Age-adjusted upper limits for PSA were recommended by the PCRMP:

Age	PSA level (ng/ml)
50-59 years	3.0
60-69 years	4.0

Age	PSA level (ng/ml)
> 70 years	5.0

PSA levels may also be raised by*:

- benign prostatic hyperplasia (BPH)
- prostatitis and urinary tract infection (NICE recommend to postpone the PSA test for at least 1 month after treatment)
- ejaculation (ideally not in the previous 48 hours)
- vigorous exercise (ideally not in the previous 48 hours)
- urinary retention
- instrumentation of the urinary tract

Poor specificity and sensitivity

- around 33% of men with a PSA of 4-10 ng/ml will be found to have prostate cancer. With a PSA of 10-20 ng/ml this rises to 60% of men
- around 20% with prostate cancer have a normal PSA
- various methods are used to try and add greater meaning to a PSA level including age-adjusted upper limits and monitoring change in PSA level with time (PSA velocity or PSA doubling time)

*whether digital rectal examination actually causes a rise in PSA levels is a matter of debate

Question 64 of 69

A 34-year-old man presents to an emergency surgery with abdominal pain. This started earlier on in the day and is getting progressively worse. The pain is located on his left flank and radiates down into his groin. He has had no similar pain previously and is normally fit and well. Examination reveals a man who is flushed and sweaty but is otherwise unremarkable. What is the most suitable initial management?

- ☐ A. Oral ciprofloxacin
- ☒ B. IM diclofenac 75 mg
- ☐ C. Oral co-amoxiclav and metronidazole
- ☐ D. IM morphine 5 mg
- ☐ E. IM diclofenac 75 mg + start bendroflumethiazide to prevent further episodes

This man may need to be referred acutely to the surgeons for pain relief and investigations to exclude obstruction. It would not be suitable to start bendroflumethiazide in the initial phase of the first episode

Renal stones: management

Acute management of renal colic

Medication

- the British Association of Urological Surgeons (BAUS) recommend diclofenac (intramuscular/oral) as the analgesia of choice for renal colic*
- BAUS also endorse the widespread use of alpha-adrenergic blockers to aid ureteric stone passage

Imaging

- patients presenting to the Emergency Department usually have a KUB x-ray (shows 60% of stones)
- the imaging of choice is a non-contrast CT (NCCT). 99% of stones are identifiable on NCCT. Many GPs now have direct access to NCCT

Stones < 5 mm will usually pass spontaneously. Lithotripsy and nephrolithotomy may be for severe cases.

Prevention of renal stones

Calcium stones may be due to hypercalciuria, which is found in up to 5-10% of the general population.

- high fluid intake
- low animal protein, low salt diet (a low calcium diet has not been shown to be superior to a normocalcaemic diet)
- thiazides diuretics (increase distal tubular calcium resorption)

Oxalate stones

- cholestyramine reduces urinary oxalate secretion

- pyridoxine reduces urinary oxalate secretion

Uric acid stones

- allopurinol
- urinary alkalinization e.g. oral bicarbonate

*Diclofenac use is now less common following the MHRA warnings about cardiovascular risk. It is therefore likely the guidelines will change soon to an alternative NSAID such as naproxen

Question 65 of 69

Which one of the following statements regarding prostate specific antigen (PSA) testing is NOT true?

- | | |
|----------------------------------|---|
| <input type="radio"/> | A. Around a third of men with a PSA of 4-10 ng/ml will be found to have prostate cancer |
| <input checked="" type="radio"/> | B. A PSA level of 3.8 ng/ml in a 55-year-old man is normal |
| <input type="radio"/> | C. Around 20% of patients diagnosed with prostate cancer have a normal PSA |
| <input type="radio"/> | D. PSA levels rise following ejaculation |
| <input type="radio"/> | E. Very high PSA levels (e.g. > 50 ng/ml) suggest metastatic disease |

Prostate cancer: PSA testing

Prostate specific antigen (PSA) is a serine protease enzyme produced by normal and malignant prostate epithelial cells. It has become an important tumour marker but much controversy still exists regarding its usefulness as a screening tool.

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- prostatitis and urinary tract infection (NICE recommend to postpone the PSA test for at least 1 month after treatment)
- ejaculation (ideally not in the previous 48 hours)
- vigorous exercise (ideally not in the previous 48 hours)
- urinary retention
- instrumentation of the urinary tract

Poor specificity and sensitivity

- around 33% of men with a PSA of 4-10 ng/ml will be found to have prostate cancer. With a PSA of 10-20 ng/ml this rises to 60% of men
- around 20% with prostate cancer have a normal PSA
- various methods are used to try and add greater meaning to a PSA level including age-adjusted upper limits and monitoring change in PSA level with time (PSA velocity or PSA doubling time)

*whether digital rectal examination actually causes a rise in PSA levels is a matter of debate

Question 66 of 69

A 79-year-old complains of lower urinary tract symptoms. Which one of the following statements regarding benign prostatic hyperplasia is incorrect?

- ✓ ☒ A. Goserelin is licensed for refractory cases
- ☐ B. Side-effects of 5 alpha-reductase inhibitors include ejaculation disorders and gynaecomastia
- ☐ C. Possible presentations include recurrent urinary tract infection
- ☐ D. 5 alpha-reductase inhibitors typically decrease the prostate specific antigen level
- ☐ E. More common in black men

Goserelin (Zoladex) is not used in the management of benign prostatic hyperplasia

Benign prostatic hyperplasia

Benign prostatic hyperplasia (BPH) is a common condition seen in older men.

Risk factors

- age: around 50% of 50-year-old men will have evidence of BPH and 30% will have symptoms. Around 80% of 80-year-old men have evidence of BPH
- ethnicity: black > white > Asian

BPH typically presents with lower urinary tract symptoms (LUTS), which may be categorised into:

- voiding symptoms (obstructive): weak or intermittent urinary flow, straining, hesitancy, terminal dribbling and incomplete emptying
- storage symptoms (irritative) urgency, frequency, urgency incontinence and nocturia
- post-micturition: dribbling
- complications: urinary tract infection, retention, obstructive uropathy

Management options

- watchful waiting
- medication: alpha-1 antagonists, 5 alpha-reductase inhibitors. The use of combination therapy was supported by the Medical Therapy Of Prostatic Symptoms (MTOPS) trial
- surgery: transurethral resection of prostate (TURP)

Alpha-1 antagonists e.g. tamsulosin, alfuzosin

- decrease smooth muscle tone (prostate and bladder)
- considered first-line, improve symptoms in around 70% of men
- adverse effects: dizziness, postural hypotension, dry mouth, depression

5 alpha-reductase inhibitors e.g. finasteride

- block the conversion of testosterone to dihydrotestosterone (DHT), which is known to induce BPH
- unlike alpha-1 antagonists causes a reduction in prostate volume and hence may slow disease progression. This however takes time and symptoms may not improve for 6 months. They may also decrease PSA concentrations by up to 50%
- adverse effects: erectile dysfunction, reduced libido, ejaculation problems, gynaecomastia

Question 67 of 69

You receive a fax through from urology. One of your patients with a raised PSA recently underwent a prostatic biopsy. The report reads as follows:

Adenocarcinoma prostate, Gleason 3+4

Which one of the following statements regarding the Gleason score is incorrect?

- | | |
|----------------------------------|--|
| <input type="radio"/> | A. Grades the glandular architecture seen on histology following hollow needle biopsy |
| <input type="radio"/> | B. The Gleason grade ranges from 1 to 5 |
| <input type="radio"/> | C. The Gleason score ranges from 2 to 10 |
| <input checked="" type="radio"/> | D. The lower the Gleason score the worse the prognosis |
| <input type="radio"/> | E. Used to predict prognosis in patients with prostatic cancer |

Prostate cancer: prognosis

The Gleason score is used to predict prognosis in patients with prostatic cancer. The grading system is based on the glandular architecture seen on histology following hollow needle biopsy

The most prevalent and the second most prevalent pattern seen are added to obtain a Gleason score. The Gleason grade ranges from 1 to 5 meaning the Gleason score ranges from 2 to 10 (i.e. two values added)

The higher the Gleason score the worse the prognosis

Question 68 of 69

Each one of the following is a risk factor for gastric cancer, except:

- | | |
|----------------------------------|-----------------------------------|
| <input type="radio"/> | A. Blood group A |
| <input type="radio"/> | B. Pernicious anaemia |
| <input type="radio"/> | C. <i>H. pylori</i> infection |
| <input type="radio"/> | D. Smoking |
| <input checked="" type="radio"/> | E. History of duodenal ulceration |

Gastric cancer

Epidemiology

- overall incidence is decreasing, but incidence of tumours arising from the cardia is increasing
- peak age = 70-80 years
- more common in Japan, China, Finland and Colombia than the West
- more common in males, 2:1

Associations

- *H. pylori* infection
- blood group A: gAstric cAncer
- gastric adenomatous polyps
- pernicious anaemia
- smoking
- diet: salty, spicy, nitrates
- may be negatively associated with duodenal ulcer

Investigation

- diagnosis: endoscopy with biopsy
- staging: CT or endoscopic ultrasound - endoscopic ultrasound has recently been shown to be superior to CT

Question 69 of 69

A 60-year-old man is worried about his risk of developing colorectal cancer. Following the introduction of the national screening programme how often is such a patient offered a faecal occult blood screening test?

- | | |
|----------------------------------|-------------------------------------|
| <input type="radio"/> | A. Every year |
| <input checked="" type="radio"/> | B. Every two years |
| <input type="radio"/> | C. Every three years |
| <input type="radio"/> | D. Every five years |
| <input type="radio"/> | E. On one occasion at the age of 65 |

Colorectal cancer: screening

Overview

- most cancers develop from adenomatous polyps. Screening for colorectal cancer has been shown to reduce mortality by 16%
- the NHS now has a national screening programme offering screening every 2 years to all men and women aged 60 to 69 years. Patients aged over 70 years may request screening
- eligible patients are sent faecal occult blood (FOB) tests through the post
- patients with abnormal results are offered a colonoscopy

At colonoscopy, approximately:

- 5 out of 10 patients will have a normal exam
- 4 out of 10 patients will be found to have polyps which may be removed due to their premalignant potential
- 1 out of 10 patients will be found to have cancer

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